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EPA Superfund
Record of Decision:

FLANDERS FILTERS INC
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WASHINGTON, NC
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RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

FLANDERS FILTERS, Inc. SITE
WASHINGTON, BEAUFORT COUNTY
NORTH CAROLINA

<IMG SRC 98085A>

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

September 1998

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Flanders Filters, Inc.
Flanders Filters Road, Washington, Beaufort County, North Carolina

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Remedial Action for the Flanders Filters, Inc. Site in Washington, North Carolina, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan. This decision is based on the Administrative Record file for this Site.

The State of North Carolina concurs with the selected remedy. The State's concurrence on this Record of Decision can be found in Appendix A of this document.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment. Presently, no unacceptable current risks are associated with the Flanders Filters, Inc. Site as the contaminated groundwater beneath the Site is discharging into on-site drainage ditches and Mitchell Branch. The principle risk pertains to the potential future use of the adversely impacted groundwater beneath the Site.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy relies on natural degradation processes to reduce the level of contaminants in the groundwater. The following activities are also incorporated into this Remedial Action: confirmation that private wells in the Shad Bend subdivision have not been adversely impacted, institutional controls, abandonment of inactive public supply wells, and removal of the aboveground storage tanks in Area of Concern #5. In the event that natural degradation fails to result in a significant reduction in groundwater concentrations within three years of the signing of this Record of Decision, the contingency remedy will be implemented. The contingency remedy, which is one of the alternatives presented in this Record of Decision, involves the installation of an air sparging/soil vapor extraction system along with institutional controls, abandonment of the inactive public supply wells, and removal of the aboveground storage tanks in Area of Concern #5. Based on current conditions, no air emission controls will be necessary for the soil vapor extraction system. However, if the contingency remedy is implemented, this determination will need to be re-evaluated.

The major components of the selected remedial alternative include:

- Monitored Natural Attenuation -- The quality of the groundwater and surface water/sediment will be monitored on a periodic basis. Monitoring of the wetlands between the Site and Mitchell Branch shall also be included in this monitoring plan.

- Sample Private Wells -- Sample all private wells in the Shad Bend subdivision to insure that these wells have not been adversely impacted by Site activities and incorporate these wells into the long-term monitoring plan.

- Institutional Controls -- Institutional controls shall include "land use restrictions" and "deed recordation" under appropriate North Carolina regulations.

- Abandonment of Inactive Supply Wells - Four inactive supply wells will be abandon to prevent the migration of contaminants into the lower aquifer. These wells will be abandoned in accordance to North Carolina regulations.

- Remove Aboveground Storage Tanks From Area #5 -- The tanks in this area of the Site will be emptied, cleaned, and disposed of in accordance to the appropriate regulations. Underlying soils will be inspected and sampled if warranted.

- Five-Year Review Reports - Prepare and submit Five-Year Review Reports until the specified groundwater performance standards are achieved throughout the entire contaminated plume.

The major components of the contingent remedial alternative include:

- Air Sparging/Soil Vapor Extraction System - An air sparging/soil vapor extraction system will be installed in two areas. Due to the low levels of emissions expected, the vapors would be discharged directly into the atmosphere and no air discharge permit is expected to be required.

- Sample Private Wells - Sample all private wells in the Shad Bend subdivision to insure that these wells have not been adversely impacted by Site activities.

- Five-Year Review Reports - Prepare and submit Five-Year Review Reports until the specified groundwater performance standards are achieved throughout the entire contaminated plume.

If the following components have not been completed as part of the selected remedy described above, the following components shall be completed as part of the contingent remedial alternative:

- Institutional Controls -- Institutional controls shall include "land use restrictions" and "deed recordation" under appropriate North Carolina regulations.

- Abandonment of Inactive Supply Wells -- Four inactive supply wells will be abandon to prevent the migration of contaminants into the lower aquifer. These wells will be abandoned in accordance to North Carolina regulations.

- Remove Aboveground Storage Tanks From Area #5 -- The tanks in this area of the Site will be emptied, cleaned, and disposed of in accordance to the appropriate regulations. Underlying soils will be inspected and sampled if warranted.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable. The physical, chemical, and/or biological processes encapsulated under monitored "natural attenuation" satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Since this remedy may result in hazardous substances remaining in the groundwater on-site above the chemical-specific applicable requirements, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

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DECISION SUMMARY
RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

FLANDERS FILTERS, Inc. SITE
WASHINGTON, BEAUFORT COUNTY
NORTH CAROLINA

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

SEPTEMBER 1998

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APPENDICES

LIST OF ACRONYMS

AOC	-	Area of Concern
ARARs	-	Applicable or Relevant and Appropriate Federal, State or Local Requirements
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)
cm/sec	-	centimeter per second
1,1-DCA	-	1,1-Dichloroethane
1,1-DCE	-	1,1-Dichloroethene
e.g.	-	for example
EPA	-	Environmental Protection Agency
ESI	-	Expanded Site Inspection
FS	-	Feasibility Study
gpd	-	gallons per day
i.e.	-	that is
MCLs	-	Maximum Contaminant Levels
mg/kg	-	milligrams per kilogram
NCAC	-	North Carolina Administrative Code
NCDEM	-	North Carolina Department of Environment Management
NCDENR	-	North Carolina Department of Environment and Natural Resources
NCP	-	National Oil and Hazardous Substances Pollution Contingency Plan
ND	-	Not Detected
NPDES	-	National Pollution Discharge Elimination System
NPL	-	National Priority List
O&M	-	Operation and Maintenance
ppb	-	parts per billion
ppm	-	parts per million
POTW	-	Publicly Owned Treatment Works
PRP	-	Potentially Responsible Party
PW	-	Present Worth
RA	-	Remedial Action
RCRA	-	Resource Conservation and Recovery Act
RD	-	Remedial Design
RD/RA	-	Remedial Design/Remedial Action
RI	-	Remedial Investigation
RI/FS	-	Remedial Investigation/Feasibility Study
ROD	-	Record of Decision
SARA	-	Superfund Amendments and Reauthorization Act of 1986
SSI	-	Site Screening Inspection
SVOCs	-	Semi-volatile Organic Compounds
TBC	-	To Be Considered
1,1,1-TCA	-	1,1,1-Trichloroethane
TCLP	-	Toxicity Characteristic Leaching Procedure
TMV	-	Toxicity, Mobility, or Volume
Ig/kg	-	micrograms per kilogram
Ig/l	-	micrograms per liter
VOCs	-	Volatile Organic Compounds

RECORD OF DECISION
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
FLANDERS FILTERS, Inc. SITE
WASHINGTON, BEAUFORT COUNTY, NORTH CAROLINA

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Flanders Filters, Inc. Site (the "Site") is located on Flanders Filters Road in Washington, Beaufort County, North Carolina and occupies 65 acres. The Site is approximately 4 miles northwest of Washington, in the Coastal Plain of North Carolina, at 355 35' 14" N latitude and 775 06'23" W longitude. Figure 1 shows the location of the Site with respect to Washington as well as the surrounding topographical characteristics. The Flanders Filters facility, refer to Figure 2, includes the following features: the main plant building, four warehouses, a metal shop, a maintenance shop, a paint shop, a water treatment plant, a chemical storage shelter, a nitrification field (leach field) for the septic system, two former spray fields, aboveground storage tank area, and other support structures.

Presently, land use immediately adjacent to the Site is a mixture of agricultural and residential. The Site is bordered to the north, northwest, and west by agricultural land and an abandoned railroad right of way. A stream, called Mitchell Branch, and it's associated wetland area is adjacent to the east. Land to the south is occupied by the Shad Bend subdivision.

Natural features include a relatively flat topography, two streams, and two on-site drainage ditches. The topography elevation changes slightly. The Site slopes from northwest to southeast towards Mitchell Branch. The elevation ranges from about 25 feet above mean sea level to approximately sea level (refer to Figure 1). The two streams are Mitchell Branch and Tranters Creek. No natural springs or seeps exist on the Flanders Filters' property.

The climate is fairly mild throughout the year. Precipitation averages 51 inches annually with a net rainfall amount of 9 inches per year. The portion of the Site adjacent to Mitchell Branch lies in the 100-year flood plain.

Precipitation runoff from the Site flows into storm drains which empty into 1) a drainage ditch along the northern property line, 2) directly into this drainage ditch, or 3) to the drainage ditch that runs between the leach field and former Spray Field #2. These two drainage ditches join together prior to leaving the Site (refer to Figure 2). The combined drainage ditch empties into Mitchell Branch that meanders south and then turns west until joining Tranters Creek. In turn, Tranters Creek flows southeast for about 3.5 miles until it joins the Tar River near the upper reaches of the Pamlico River. Large wetland areas border both Mitchell Branch and Tranters Creek for the majority of their lengths. The December 1990 Site Screening Inspection (SSI) report and the 1993 Expanded Site Inspection (ESI) report, both prepared by EPA, stated there was reportedly a surface water intake approximately 3.5 miles downstream on Tranters Creek. The 1997 RI report states there are no active surface water intakes located within 15 miles downstream of the Site.

Recreational fishing occurs on Tranters Creek, however, no recreational swimming was observed, but private docks were present at nearly every residence along the creek. No recreational fishing was observed on Mitchell Branch but, near where it joins Tranters Creek, it appeared to be suitable. The upstream reach of Mitchell Branch is very shallow.

The 1990 census indicated the population within a one-mile radius of the Site is approximately 615 and about 6,600 within a four-mile radius. The nearest residences are located about 300 feet south of the facility in Shad Bend subdivision (see Figure 2). Other private residences are located to the west and southwest along Flanders Filters Road.

The City of Washington supplies water to the Flanders Filters facility and to the majority of residents in Shad Bend community. A house-to-house survey of the nineteen residences in the Shad Bend community confirmed that one family uses their private well for their source of potable water and another resident drinks bottled water and uses their well water for irrigation. Other private supply wells are in use in the surrounding area. A survey within the 0.5-mile radius of the Site boundaries identified approximately 141 residences, two businesses, a Head Start Center, and the Deeper Life Ministries. The Deeper Life Ministries and three residences are on city water. The remaining 137 structures are supplied by 77 private potable wells, None of these wells are considered directly hydraulically downgradient of the Flanders Filters facility. Consequently, contamination detected in the groundwater and originating from the Site will not impact these wells.

Three classifications of vegetation were identified at the Site. The predominant type (around Spray Field #2 and at the westem property boundary) is a sandy/dry oak hickory forest. The wetlands along Mitchell Branch are classified as a gum cypress swamp and there is small stream swamp vegetation along the drainage ditches.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1969, Flanders Filters developed this property and has since used this facility for the manufacturing of high-efficiency, borosilicate glass micro-filters and air filter framing systems. Currently, Flanders Filters, Inc. employs about 300 personnel working three shifts, five days per week. The property is partially fenced and has gates at the three entrances to the plant.

In April 1969, North Carolina Division of Environmental Management (NCDEM) issued to Flanders Filters a permit (#1590) to construct and operate a facility to handle 1,000 gallons of wastewater from the manufacturing process per day. The wastewater facility included two retention ponds which had a total storage capacity of 330,000 gallons. From 1969 to 1978, an estimated 500 to 700 gallons of untreated wastewater were transported daily to the Old Beaufort County landfill for disposal. No records or manifests were kept of these shipments.

In April 1977, NCDEM issued Flanders Filters permit #4276 for a 4,500 gallons per day (gpd) wastewater treatment system and the use of a 2.75-acre spray field (Spray Field #1) for the discharge of the treated wastewater. This spray field is now partially covered by the metal shop (refer to Figure 2). A clay-lined by-pass pond was part of this treatment system. The use of this facility began in February 1978. No records are available pertaining to the estimated daily volume discharged to Spray Field #1. Permit #4276 was renewed in March 1982. As a condition of this renewal, Flanders Filters was required to install three monitoring wells and monitor the groundwater for aluminum and zinc.

In May 1984, Flanders Filters received authorization (permit # 4276-R) to open a 4.08-acre spray field (Spray Field #2) located southeast of the plant area. This permit required that additional monitoring wells be installed. The metal shop area was expanded in 1984 and Spray Field #1 was closed. Also in May 1984, Flanders Filters requested approval to use the existing wastewater treatment system for the disposal of treated wastewater from a newly installed metal cleaning system. This system was used for removing mild surface contaminants and weld oxidation from stainless steel and aluminum filter frames.

During 1986 and 1987, Flanders Filters maintained their permit and obtained approval to increase flow to Spray Field #2 from 4,500 gpd to 10,000 gpd. No records are available pertaining to the estimated daily volume discharged to Spray Field #2 during this time. In April 1988, Flanders Filters requested approval to increase the size of Spray Field #2. In response, the State expressed concern about elevated groundwater levels of nitrate, total dissolved solids, phenol, and aluminum. Consequentially, the State required the installation of three additional monitoring wells. In August 1988, permission was granted to expand the spray field to 8.24 acres with an increase in flow to 20,000 gpd.

In February 1989, the State allowed an increase in flow to 30,000 gpd (under permit # WQ0000628). As before, no discharge records are available for this time frame, but it has been reported that the estimated daily volume of treated wastewater discharged to Spray Field #2 was 2,000 gallons per hour for 8 hours per day, five days per week. Spray Field #2 was operated for about 10 years and is no longer in operation.

In December 1990, EPA issued the SSI report. Based on the analytical results from the environmental samples collected as part of the SSI, the following contaminants were detected in the groundwater: l,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), and 1,1,1-trichloroethane (1,1,1-TCA).

During June and July 1993, EPA conducted an ESI at the Flanders Filters site. This study documented the presence of the following contaminants at the Site: chromium, copper, nickel, zinc, bis(2-ethylhexyl)phthalate, pyrene, and arsenic. No contaminants of concern were identified in a sample collected from a nearby private well. Bis(2-ethylhexyl)phthalate and 1,1-DCA were found above detectable levels in one on-site public supply well.

The Flanders Filters site has not been proposed for the National Priorities List (NPL), however, it is considered a NPL caliber site as the groundwater contamination at the Site is the caliber of contamination found at sites listed on the NPL. Since there has only been one owner/operator of this property after being developed into an industrial complex, no "Responsible Party Search" was performed. Flanders Filters, Inc. has been and remains the sole owner/operator of the facility. A special notice letter was sent to Flanders Filters, Inc. on October 10, 1995 to provide Flanders Filters an opportunity to conduct the remedial investigation/feasibility study (RI/FS). A good faith offer was submitted and negotiations were concluded with Flanders Filters, Inc. signing an Administrative Order on Consent in February 1996 to conduct a Remedial Investigation (RI) and Feasibility Study (FS) at the Site. It is anticipated that Flanders Filters will also implement the selected remedy. In addition to conducting the RI/FS, Flanders Filters has also taken the following actions at the Site in an effort to eliminate future adverse impacts to the environment as well as minimize their generation of hazardous waste. The use of the spray fields has been discontinued and wastewater is now discharged to the City of Washington publicly owned treatment works (POTW). The facility has virtually eliminated the use of chlorinated solvents. The acid dip pickling process that generated waste sludge and water has been eliminated. And a new hazardous waste storage area has been constructed under roof on a diked concrete pad.

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3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

In 1996, community relations activities for this Site were initiated in conjunction with the development of the RI/FS Work Plan. In developing the June 1996 Community Involvement Plan, the issues and concerns expressed by local citizens from the Site area were compiled and an overview of these issues and concerns was prepared. A copy of the Community Relations Plan was placed in the Information Repository located at the Brown Public Library in Washington. A mailing list was developed based upon people interviewed citizens living around the Site, and people attending Site related public meetings. The mailing list also includes local, State, and Federal public servants and elected officials.

A public kick-off meeting was held on June 27, 1996. During the RI/FS process, two fact sheets were mailed and several public meetings were held with respect to the Site.

The public was informed of the June 23, 1998 Proposed Plan Public Meeting through the Proposed Plan Fact Sheet and ads published on June 20, 21, 22, and 23, 1998, in the Washington Daily News newspaper. The Proposed Plan Fact Sheet was mailed to the public on June 19, 1998. The basis of the information presented in the Proposed Plan was the July 1997 RI Report and the March 1998 FS document. The Proposed Plan also informed the public that the public comment period would run from June 23, 1998 to July 23, 1998.

Prior to the Proposed Plan Public Meeting, representatives from EPA met with City and County officials to present to them a summary of information to be shared with the public during the evening public meeting. This meeting provided locally elected officials the opportunity to ask questions and make comments concerning the Agency's proposed activities.

The goals of the Proposed Plan meeting were to review the findings of the RI (including the Baseline Risk Assessment), summarize the remedial alternatives developed, identify the Agency's preferred alternative as well as the contingent alternative, present the Agencys rationale for the selection of the preferred alternative, encourage the public to voice its own opinion with respect to the remedial alternatives evaluated and the remedial alternative proposed by the Agency, and inform the public that the public comment period on the Proposed Plan would conclude on July 23, 1998. The public was also informed that a 30 day extension to the public comment period could be requested and that all comments received during the public comment period would be addressed in the Responsiveness Summary section of the Record of Decision (ROD.) No request for the 30-day extension was made.

Pursuant to Section 113(k)(2)(B)(i-v) and 117 of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), all documents associated with the development of the Proposed Plan and the selection of the remedial alternative specified in this ROD were made available to the public in the Administrative Record located both in the Information Repository maintained at the EPA Docket Room in Region 4's office and at the Brown Public Library in Washington, North Carolina. A copy of all literature distributed at each public meeting, as well as a transcript of meeting proceedings, were also placed in the Information Repositories.

4.0 SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

This ROD has been prepared to summarize the remedial selection process and to present the selected remedial alternative for the entire Flanders Filters site. The source of the principle threat at the Site was the contaminated soil. Neither surface nor subsurface soils pose an unacceptable current or future risk to either public health or the environment. Due to the concentration of chemicals from the source (i.e., soil) found in the underlying groundwater, the groundwater does pose an unacceptable risk.

The purpose of this response is to prevent exposure to the contaminated groundwater. Since this Site is not as complex as other NPL sites, all work will be accomplished under one operable unit, therefore this is expected to be the only ROD for this Site. An operable unit is assigned for each separate activity undertaken as part of a Superfund site cleanup.

5.0 SUMMARY OF SITE CHARACTERISTICS

In developing the June 1996 RI/FS Work Plan, nine (9) areas of concern (AOC) (i.e., potential sources of contamination or areas that may have already been adversely impacted) were identified (refer to Figure 3). The nine AOC include:

AOC #1 - Vat/Hazardous Waste/Drum Storage Area
AOC #2 - Retention Ponds
AOC #3 - Spray Field #1/Metal Shop Area
AOC #4 - Spray Field #2
AOC #5 - Aboveground Storage Tanks and By-pass Pond
AOC #6 - Abandoned Railroad Track
AOC #7 - Drainage Ditches (Collectively)
AOC #8 - Mitchell Branch
AOC #9 - Groundwater Underlying the Site

To investigate these potential areas of contamination and to determine the extent of any contamination at the Site, seventy (70) environmental samples were collected as part of the RI.

The RI Report, dated July 28, 1997, (which includes the December 15, 1997 revised Baseline Risk Assessment) was approved by the Agency on January 26, 1998. The RI Report identified the sources, characterized the nature, and defined the probable extent of the uncontrolled hazardous wastes in the soil, groundwater, and surface water/sediment at the Site. The Baseline Risk Assessment defined the risk posed by the hazardous contaminants present in the areas investigated. The Proposed Plan Fact Sheet provided the public with a summary of the detailed analysis of the four (4) remediation alternatives evaluated in the March 1998 FS document.

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The overall nature and extent of contamination associated with the Site is based upon analytical results of environmental samples collected from the surface and subsurface soils, the groundwater, surface water and sediment from Mitchell Branch, and sediment from Tranters Creek, and the chemical/physical and geological/hydrogeological characteristics of the area.

Environmental samples were collected over a period of time and activities. The majority of the samples collected were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganics (i.e., metals and cyanide). The RI identified the following contaminants of concern across the Site:

VOCs	Inorganics
chloroform	aluminum
1,1-DCA	antimony
1,1-DCE	chromium
tetrachloroethene	
1,1,1-TCA	
trichloroethene	
vinyl chloride	

Figures 4 and 5 show the surface and subsurface soil sampling locations along with the analytical results of the samples collected, respectively. Figures 6 and 7 show the shallow groundwater sampling locations along with the analytical results for samples collected in September 1996 and in October 1997, respectively. Figure 8 shows the intermediate groundwater sampling locations along with the analytical results for samples collected in September 1996. Figures 9 and 10 show the on-site surface water and sediment sampling locations along with the analytical results of the samples collected, respectively. Figures 11 and 12 show the off-site surface water and sediment sampling locations along with the analytical results of the samples collected, respectively. And Figure 13 shows the wetland sampling locations along with the analytical results of the samples collected.

Table 1 provides a summary of the RI/FS soil data, Table 2 summarizes the RI/FS groundwater data, Tables 3 and 4 list the surface water and sediment data, respectively, and Table 5 encapsulates the wetland data.

5.1 AREAS OF CONCERN

VOCs, SVOCs, and metals were detected in the Acid Vat/Hazardous Waste/Drum Storage Area (AOC #1). The presence of VOCs and SVOCs in the surface and subsurface soils as well as the underlying groundwater are consistent with spills and leaks that have occurred in this area over the years. The probable cause of the elevated metal levels in this area was the accidental release of approximately 440 gallons of an acidic solution in 1992 from the acid pickling operation.

The analytical data for soil samples collected from the Retention Ponds (AOC #2) and the Spray Field #1/Metal Shop area (AOC #3) indicate that neither of these areas are sources of contamination. The source of the contaminants being detected in the groundwater downgradient of AOC #2 is from the soil associated with AOC #1. The soils in AOC #1 were contaminated by past activities which included storing and/or handling hazardous waste in this area.

Trace levels of VOCs and SVOCs were detected in the soils at Spray Field #2 (AOC #4). Consequently, neither VOCs nor SVOCs are a concern in the soils in this particular area. Several inorganics were detected at concentrations twice their background level. Of these, only zinc can be traced back to past Site operations. As with the groundwater beneath AOC #2, based on groundwater flow directions, it was surmised that the VOCs being detected in the groundwater beneath AOC #4 have migrated from AOC #1.

Xylenes, numerous semi-volatile polycyclic aromatic hydrocarbons, #2 fuel oil, varsol, antimony, arsenic, copper, and zinc were detected in the soils associated with the Aboveground Storage Tanks and By-pass Pond area (AOC #5). Any adverse impact to the underlying groundwater in this area has been minimized due to the by-pass pond being clay-lined as clay impedes the migrafion of most contaminants.

The abandoned railroad track (AOC #6) was not sampled as no creosote related contaminants were detected in the adjacent drainage ditch. The two drainage ditches, collectively, were designated as AOC #7. VOCs, SVOCs, and numerous metals were detected in these drainage ditches. The impact to surface water and sediment in these drainage ditches is the result of surface water runoff from the plant and parking lot and groundwater recharge to the these ditches.

Based on surface water and sediment samples collected from Mitchell Branch (AOC #8), it has been documented that Site related VOCs are being released into this stream. These contaminants are reaching Mitchell Branch either through the discharge of groundwater into Mitchell Branch or from surface water flowing through drainage ditches and discharging into Mitchell Branch, or from a combinabon of the two. No elevated levels of metals were detected in the sediment samples collected from Tranters Creek.

The groundwater underlying the Site and migrating towards Mitchell Branch is defined as AOC #9. Numerous contaminants have been detected in the groundwater at the Site. They include: chloroform, 1,1-DCA, 1,1-DCE, tetrachloroethene, 1,1,1-TCA, trichloroethene, vinyl chloride, aluminum, antimony, and chromium. Refer to Sections 5.3 and 5.5 for more details.

5.2 SUMMARY OF SOIL CONTAMINATION

Organics (fuel oil and varsol SVOC constituents) and inorganics were detected in the surface soils in AOC #5, adjacent to fuel aboveground storage tanks. In addition, levels of organic and inorganic compounds were found above background levels in the surface soils in AOC #1. VOCs and nickel were detected in the subsurface soils at AOC #1. The identified VOCs include: 1,1-DCE, PCE, 1,1,1-TCA, and TCE. The greatest VOC concentration in the subsurface soils at AOC #1 was 0.59 milligram/kilogram (mg/kg) or parts per million (ppm) of 1,1,1-TCA (see Table 1).

Antimony was found above the health-based remedial goals, specified in North Carolina Department of Environment and Natural Resources (NCDENR) Registered Environmental Consultant Program Implementation Guidance promulgated in 15A North Carolina Administrative Code (NCAC) 13C.0300, in one surface soil sample collected in AOC #1. However, antimony was not detected in two additional surface soil samples collected from AOC #1.

These two additional samples were collected from AOC #1 to evaluate whether or not soils at AOC #1 require remediation. First, contaminant levels in the soils were compared to NCDENR remedial goals to determine if a threat was posed to human health. Secondly, these soils were tested to determine if the contaminants present would leach out of the soil resulting in levels of contaminants that would adversely impact the quality of the groundwater. The toxicity characteristic leaching procedure (TCLP) was used to evaluate the potential for soils to leach residual contamination.

None of the contaminants of concern concentrations in the soils in AOC #1 exceed health-based remedial goals established by NCDENR. Therefore, it was determined that the soils in AOC #1 do not require remediation to be protective of human health. The data showed that concentrations of COCs in the leachate were not above groundwater standards. Therefore, based on NCDENR guidance, the soils in AOC #1 are not considered a threat to groundwater quality and further support the decision that these soils do not need remediation.

5.3 SUMMARY OF GROUNDWATER CONTAMINATION

The highest levels of contaminants in the groundwater were found downgradient of the hazardous waste storage area (AOC #1) with trace levels extending across portions of the Site (refer to Figures 6, 7, and 8). The presence of trace levels of VOCs and elevated concentrations of metals were found in two of the four former public supply wells (Well-2A and Well-2B). When operational, these wells created a cone of depression in the groundwater table. Impacted groundwater from the sufficial aquifer may have entered the intermediate aquifer through the single-cased Well-2B. These wells were taken out of service in 1995. Data from an October 1997 sampling effort indicates that Well-2A does not contain VOC or metals concentrations above the performance standards.

Two shallow monitoring wells (OW-1 and OW-2) were installed on the other side of Mitchell Branch as part of the RI. The rationale for the installation of these wells was 1) to determine if Mitchell Branch is a hydrogeologic divide for groundwater and 2) to insure residents with private potable wells on the other side of Mitchell Branch (i.e., off-site) that the source of their drinking water (i.e., the groundwater) has not been adversely impacted by Site activities. Neither well contained volatile nor semi-volatile organic compounds above trace levels. Concentrations of metals were also below levels of concern. The only organic contaminant detected in either off-site monitoring well was toluene and it was detected at a trace level. This data along with groundwater level measurements, verify that Mitchell Branch is a hydrogeologic divide and that any contaminants that do migrate off-site via groundwater will discharge into Mitchell Branch and will not travel east of Mitchell Branch via groundwater. These wells will now act as sentinel wells and will be sampled periodically to insure these residents that their drinking water has not been adversely impacted by Site activities.

Data collected over time indicates contaminant levels in the groundwater are decreasing across the site (see Table 7). This observation is supported by the results of the Bioscreen model which was performed as part of the FS.

Figures 6, 7, and 8 map the analytical data for groundwater samples collected in September 1996 and October 1997. Figures 14, 15, and 16 show the extent of migration for the contaminants 1,1-DCA, 1,1-DCE, and PCE in the shallow aquifer, respectively. In Figure 14, the curved line that mimics the tree line in the southern portion of the Site that runs from monitoring well #4 (MW-4) easterly to monitoring well #10 (MW-10) identifies the extent of 1,1-DCE migration at the Site. As can be seen in Figures 15 and 16, the other contaminants in the groundwater either mimic this depiction of migration or have not migrated as far as 1,1-DCE.

5.4 SUMMARY OF SURFACE WATER AND SEDIMENT CONTAMINATION

The RI/FS concluded that the groundwater from the surficial aquifer beneath the Site is discharging into the on-site drainage ditches and Mitchell Branch. Trace levels of VOCs were detected in surface water samples from Mitchell Branch (Table 3 and Figure 9). As can be seen in comparing the concentrations of the contaminants between on-site and off-site surface water samples, the concentrations of the contaminants drop significantly prior to this surface water commingling with Mitchell Branch. Acetone, methyl ethyl ketone, arsenic, and zinc were detected in the sediment samples (Table 4 and Figure 10).

Low levels of VOCs and metals water were also detected in the wetlands adjacent to Mitchell Branch (refer to Figure 13). None of these constituents, at the concentrations detected, will result in an adverse impact to the environment. The presence of these contaminants are attributed to surface water flow and groundwater discharge from the shallow aquifer. No elevated levels of metals were detected in the Tranters Creek sediments which indicates that Tranters Creek has not and should not be adversely impact by past Site activities.

5.5 HYDROGEOLOGICAL SETTING

The Site is located in the North Carolina Coastal Plain Physiographic Province. This region is underlain by Quarternary to Cretaceous age sedimentary deposits composed mostly of sand with lesser amounts of gravel and limestone. Regional Coastal Plain aquifer units and their related confining layers are the surficial aquifer, the Yorktown, the Pungo River, the Castle Hayne, the Beaufort, the Peedee, the Black Creek, the Upper Cape Fear, and the Lower Cape Fear.

The Site is underlain by Quarternary sediments, the Yorktown Formation, the Castle Hayne Limestone, the Beaufort Formation, the Peedee Formation, and the Upper and Lower Cape Fear Formations. The surficial or Quarternary aquifer consists of a yellow-orange to light brown or tan silty sand to a depth of approximately 14 to 23 feet. The surficial sand layer is an unconfined aquifer with relatively high hydraulic conductivity and a shallow hydraulic gradient. In general, groundwater was encountered approximately 1.75 feet below grade.

The underlying Yorktown Formation is a fossiliferous green-gray silty clay stratum about 28 to 30 feet in thickness. The Yorktown clay is a confining layer that impedes downward movement of groundwater to the underlying aquifers. The estimated hydraulic conductivity of the Yorktown clay is on the order of 10^{-3} to 10^{-4} feet/day (3.5×10^{-7} to 3.5×10^{-8} centimeters/second (cm/sec)).

Below the Yorktown clay, a layer of greenish-gray to light brown silty fine sand with some limestone, 13 to 16 feet thick, was encountered. Based on published literature and soil conditions, this stratum was determined to be the upper unit of the Castle Hayne Formation.

Below this unit, the porous limestone of the Castle Hayne Formation was encountered to a depth of about 63 feet.

Based on a literature review, it is estimated that the hydraulic conductivity is 29 feet per day (0.6 cm/sec) for the surficial aquifer and that wells installed in this formation will yield anywhere between 2 to 30 gpm. Based on the water level measurements collected from the shallow wells, the hydraulic gradient for the surficial aquifer ranges between 0.002 to 0.004 feet/feet to the southeast.

December 1996 and July 1997 water levels, Table 8, were used to generate the water level contour maps for the shallow aquifer (Figures 17 and 18) and for the intermediate aquifer (Figure 19). Based on these measurements, groundwater in both the surficial and intermediate aquifers is generally flowing towards the southeast in the direction of Mitchell Branch. There are two topographical high points near the southern property boundary between the Site and the Shad Bend subdivision (see Figure 1) which also exert influence. The groundwater level data collected establishes that the Site is hydraulically downgradient from the Shad Bend community as well as the houses/businesses on Flanders Filters Road.

Based on the above discussions, it is evident that private wells in the Shad Bend community have not been adversely impacted by Site activities. This will be verified during the Remedial Design phase as these wells will be sampled and analyzed for Site related contaminants.

5.6 EXTENT OF CONTAMINATION

Figures 4 and 6, discussed in Sections 5.0 and 5.2, provide a visual depiction of the extent of contaminants detected in the surface and subsurface soils, respectively. Figures 6 and 7, discussed in Sections 5.0 and 5.3, provide a visual depiction of the extent of contaminants detected in the shallow groundwater aquifer based on samples collected in September 1996 and October 1997, respectively. Figure 8, also discussed in Sections 5.0 and 5.3, provides a visual depiction of the extent of contaminants detected in the intermediate groundwater aquifer in September 1996. Figures 9 and 11 provide a visual depiction of the dispersion of contaminants in surface water and Figures 10 and 12 provide a visual depiction of the distribution of contaminants in sediment. The data presented in these figures is based on samples collected in September 1996. Figure 13 shows the wetland sampling locations along with the analytical results of the samples collected. Figures 9, 10, 11, 12, and 13 are discussed in Sections 5.0 and 5.4.

5.7 CURRENT AND POIENTIAL FUTURE SITE AND RESOURCES USES

Mitchell Branch is not specifically classified due to the low flow conditions within the stream, however, it is considered as a Class "C" stream under North Carolina Administrative Code, Title 15A, Subchapter 2B (NCAC 15A-2B.02) because the receiving stream, Tranters Creek, is classified as a Class C stream. A Class C stream it defined as being suitable for secondary recreation and the "propagation of natural trout and maintenance of trout".

The groundwater beneath the Site is designated as Class GA in accordance with North Carolina's water classification system and Class IIA under EPA Groundwater Classification Guidelines (December 1986). The Class GA classifications means that the groundwater is an existing or potential source of ddnking water supply for humans as specified under North Carolina Administrative Code, Title 15, Subchapter 2L (NCAC 15-2L.02). EPA classifies the groundwater as Class IIA since the aquifer is currently being used as a source of drinking water in the vicinity of the Flanders Filters facility. Therefore, the groundwater needs to be remediated to a level protective of public health and the environment as specified in Federal and State regulations governing the quality and use of drinking water.

Four inactive public supply wells are located on Flanders property. When the presence of trace levels of VOCs and elevated concentrations of metals were detected in two of these wells, all of the wells were taken out of service in 1995. Now a public water supply from the City of Washington is available to all future developments in this area.

Future development may occur in the agricultural land north and northwest. No development is anticipated in the agricultural land to the west due the presence of the old Beaufort County Landfill. A March 1998 (Appendix B) letter from Flanders Filters, Inc. strongly indicates that Flanders Filters, Inc. plans to remain at this location indefinitely.

Private potable wells in the area are completed in the Castle Hayne Formation which is protected by a confining layer, the Yorktown Formation. No potable wells are located directly hydrogeologically downgradient of the Site.

6.0 SUMMARY OF SITE RISKS

In order to assess the current and future risks for the Flanders Filters site, a baseline risk assessment was conducted in conjunction with the RI. This section of the ROD summaries the findings concerning the impact to human health and the environment if contaminated media (i.e., the soils, groundwater, surface water, or sediment) at the Site are not remediated. The revised December 1997 Baseline Risk Assessment document was incorporated into the July 1997 RI report which can be found in the Flanders Filters Administrative Record.

Since use of the land surrounding the Flanders Filters facility is a mixture of residential and agricultural/industrial, two scenarios and their associated pathways were evaluated in the baseline risk assessment. Under the first scenario, the property remains as an industrial area (i.e., current conditions). Under the second scenario, the property was transformed into a residential area (i.e., future conditions).

An exposure pathway is the route or mechanism by which a chemical agent goes from a source to an individual or population (i.e., the receptor). Each exposure pathway must include (1) a source or mechanism of chemical release to the environment, (2) a transport medium (e.g., soil, groundwater, air, etc.), (3) an exposure point (where a receptor will contact the medium), and (4) an exposure route (i.e., ingestion, inhalation, or dermal contact). A pathway is considered complete when all of these elements are present.

The exposure pathways evaluated in the Flanders Filters' Baseline Risk Assessment under current conditions included ingestion, dermal contact, and inhalation of contaminated groundwater; ingestion and dermal contact to contaminated surface water and stream sediment; and ingestion and dermal contact to contaminated surface and subsurface soils. The future risk scenario developed in the Baseline Risk Assessment were for residential conditions and the same exposure pathways were examined as listed above. For groundwater, the risk assessment considered only a residential scenario as the Flanders Filters facility receives its potable water from the City of Washington. For surface water, sediment, and soil exposure scenarios, the risk assessment evaluated risks for on-site workers and trespassers. The pathways considered in the Baseline Risk Assessment are summarized in Table 9.

The Baseline Risk Assessment takes a very conservative approach in calculating risk. Table 10 summarizes the accumulative effect of all potential exposure pathways/risk scenarios identified at the Flanders Filters. Under current conditions, the only unacceptable risk is associated with current residents. However, this unacceptable risk is in conjunction with using contaminated groundwater for potable purposes. In a facsimile dated August 31, 1998, Flanders Filters identified that one resident in the Shad Bend community uses a private well for potable water. However, based on hydrogeologic data (presented in Figures 17, 18, and 19) contaminated groundwater is flowing eastwardly towards Mitchell Branch and not southernly towards the Shad Bend community. Therefore, it is not anticipated that this well has been adversely impacted. As specified in the Declaration, this well will be sampled during the Remedial Design (RD) phase to confirm its status.

Three future risk scenarios were identified which could result in an unacceptable risk to people if these scenarios became reality. These future risk scenarios entail residents living in homes built on the Site. The first two scenarios involve residential adults and residential children using the contaminated groundwater beneath the Site as their source for potable water. The third scenario that could result in another unacceptable future risk involves a child, living on-site, ingesting surface soils. The potential for any one of these three exposure scenarios to occur is extremely small, as no adults or children live on the Site nor is this a possibility in the near future.

It is the Agency's position that due to the current situation at the Flanders Filters facility that the future risk scenarios evaluated in the Baseline Risk Assessment will not come to fruition (i.e., future on-site residents). This position is supported by a March 18, 1998 correspondence from Flanders Filters, Inc. which can be found in Appendix B. This letter states that Flanders Filters, Inc. is planning is to remain at this location and keep manufacturing at this "site for the long term foreseeable future". This statement is bolstered by the fact that Flanders Filters, Inc. is currently investing over $1,000,000 in capital improvements at the facility. However, if the use of this property is changed prior to the performance standards (clean-up goals) being achieved, the Agency will re-evaluate this position.

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TABLE 1 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE SOILS

Analytes	Surface Soils Frequency of Detection	Surface Soils Range of Concentrations	Subsurface Soils Frequency of Detection	Subsurface Soils Range of Concentrations
Volatile Organic Compounds				
1,1-Dichloroethene	0/12	ND	1/14	ND - 12.0
Methylene Chloride	1/12	ND - 4.0	0/12	ND
1,1,1-Trichloroethane	1/12	ND - 6.0	2/14	150 - 590
Trichloroethene	0/12	ND	2/14	4.0 - 16.0
Tetrachloroethene	0/12	ND	2/14	29.0 - 74.0
Xylene (total)	1/12	ND - 93.0	0/14	ND
Semi-Volatile Organic Compounds				
Acenaphthene	1/12	ND - 91.0	0/14	ND
Anthracene	1/12	ND - 74.0	0/14	ND
Benzo(a)Anthracene	1/12	ND - 57.0	0/14	ND
Benzo(g,h,i)Perylene	1/12	ND - 46.0	0/14	ND
Bis(2-Ethylhexyl)Phthalate	4/12	76.0 - 9,400	1/14	ND - 370
Bis(2-Chloroethoxy)Methane	1/12	ND - 200	0/14	ND
Chrysene	2/12	49.0 - 400	0/14	ND
Diethylphthalate	1/12	ND - 610	1/14	ND - 42.0
Di-n-Butylphthalate	1/12	ND - 400	1/14	ND - 3,000
Fluoranthene	2/12	63.0 - 1,100	0/14	ND
Fluorene	1/12	ND - 110	0/14	ND
Fuel Oil #2	1/1	380	0/1	ND
Gasoline	0/1	ND	0/1	ND
Indeno(1,2,3-cd)Pyrene	1/12	ND - 39.0	0/14	ND
Kerosene	0/1	ND	0/1	ND
2-Methylnaphthalene	1/12	ND - 2,200	0/14	ND
Naphthalene	1/12	ND - 290	0/14	ND
N-Nitrosodiphenylamine	1/12	ND - 150	0/14	ND

TABLE 1   RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE SOILS

	Surface Soils		Subsurface Soils	
Analytes	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations
Phenanthrene	2/12	180 - 440	0/14	ND
Pyrene	2/12	140 - 890	0/14	ND
Varsol	1/1	580	0/1	ND
Inorganics				
Aluminum	13/13	1,100 - 4,770	14/14	576 - 3,680
Arsenic	11/13	ND - 2.5.0	6/14	ND - 1.0
Chromium	13/13	1.4 - 43.1	14/14	1.1 - 3.2
Copper	9/13	ND - 4.4	6/14	ND - 1.4
Iron	13/13	892 - 2,450	14/14	216 - 2,590
Lead	12/13	ND - 16.1	11/14	ND - 3.6
Manganese	13/13	5.3 - 33.9	14/14	2.0.0 - 12.2
Zinc	9/13	ND - 159	1/14	20.1

SAMPLES COLLECTED DURING RI
ALL REPORTED CONCENTRATIONS IN MICROGRAMS/KILOGRAM (Ig/kg)
ND -- No Detection

TABLE 2 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE GROUNDWATER

Analytes	Shallow Aquifer Sampling Locations		On-site Intermediate Well Sampling Locations		Off-site Monitoring Well Sampling Locations		Private Well Sampling Locations	
	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations
Volatile Organic Compounds								
Acetone	1/21	ND - 8.0	2/7	ND - 21.0	0/2	ND	0/6	ND
Benzene	3/21	ND - 5.0	3/7	ND - 0.3	0/2	ND	0/6	ND
Carbon Disulfide	2/21	ND - 9.0	3/7	ND - 0.5	0/2	ND	0/6	ND
Chloroethane	2/21	ND - 6.0	3/7	ND - 0.6	0/2	ND	0/6	ND
Chloroform	4/21	ND - 0.3	3/7	ND - 0.4	0/2	ND	0/6	ND
1,4-Dichlorobenzene	0/21	ND	3/7	ND - 0.2	0/2	ND	0/6	ND
1,1-Dichloroethane	18/21	ND - 120	3/7	ND - 11.0	0/2	ND	0/6	ND
1,1-Dichloroethane	19/21	ND - 73.0	3/7	ND - 5.0	0/2	ND	0/6	ND
cis-1,1-Dichlorethene	4/21	ND - 2.0	3/7	ND - 0.2	0/2	ND	0/6	ND
Tetrachloroethene	13/21	ND - 5.0	1/7	ND - 1.0	0/2	ND	0/6	ND
Toluene	0/21	ND	3/7	ND - 4.0	1/2	ND - 2.8	0/6	ND
1,1,1-Trichloroethane	18/21	ND - 600	1/7	ND - 0.2	0/2	ND	0/6	ND
Trichloroethene	11/21	ND - 14.0	4/7	ND - 0.2	0/2	ND	0/6	ND
Vinyl Chloride	3/21	ND - 6.0	0/7	ND	0/2	ND	0/6	ND
Semi-Volatile Organic Compounds								
Di-n-Butylphthalate	2/14	ND - 0.8	0/7	ND	0/2	ND	0/6	ND
2-Methylphenol	0/14	ND	1/7	ND - 1.0	0/2	ND	0/6	ND
4-Methylphenol	0/14	ND	1/7	ND - 1.0	0/2	ND	0/6	ND
Phenol	1/14	ND - 1.0	3/7	ND - 4.0	0/2	ND	0/6	ND

TABLE 2 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE GROUNDWATER

Analytes	Shallow Aquifer Sampling Locations		On-site Intermediate Well Sampling Locations		Off-site Monitoring Well Sampling Locations		Private Well Sampling Locations	
	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations
Inorganics								
Aluminum	14/14	188 - 12,100	4/7	ND - 550	2/2	763 - 4,160	0/6	ND
Artimony	1/14	ND - 21.1	0/7	ND	0/2	ND	0/6	ND
Arsenic	2/14	ND - 6.5	1/7	ND -	0/2	ND	0/6	ND
Chromium	11/14	ND - 36.9	4/7	ND - 7.9	0/2	ND	0/6	ND
Copper	5/14	ND - 5.0	1/7	ND - 2.2	0/2	ND	0/6	ND
Iron	14/14	279 - 9,840	7/7	64.9 - 116,000	2/2	1,410 - 4,500	5/6	ND - 282
Lead	8/14	ND - 5.6	6/7	ND - 42.9	1/2	ND - 3.2	0/6	ND
Manganese	14/14	30.6 - 207	6/7	ND - 508	2/2	129 - 131	1/6	ND - 20.5
Zinc	0/14	ND	4/7	ND - 2,310	0/2	ND	5/6	ND - 113

SAMPLES COLLECTED DURING RI AND FS
ALL REPORTED CONCENTRATIONS IN MICROGRAMS/LITER (Ig/l)
ND -- No DETECTION

TABLE 3 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE SURFACE WATER

Analytes	On-site Sampling Locations		Off-site Sampling Locations	
	Frequency of Detection	Range of Concentrations	Frequency of Detection	Range of Concentrations
Volatile Organic Compounds				
Acetone	5/8	ND - 20.0	0/5	ND
Benzene	2/8	ND - 0.1	0/5	ND
Chloroethane	5/8	ND - 0.5	0/5	ND
Chloroform	3/8	ND - 0.2	0/5	ND
1,1-Dichloroethane	5/8	ND - 15.0	2/5	ND - 0.5
1,1-Dichloroethene	5/8	ND - 13.0	2/5	ND - 0.4
cis-1,2-Dichloroethene	1/8	ND - 0.1	0/5	ND
Tetrachloroethene	1/8	ND - 0.04	0/5	ND
Toluene	2/8	0.2 - 0.4	0/5	ND
1,1,1-Trichloroethane	3/8	1.0 - 22.0	0/5	ND
Trichloroethene	1/8	ND - 0.3	0/5	ND
Vinyl Chloride	4/8	0.1 - 0.5	0/5	ND
Semi-Volatile Organic Compounds				
2,4-Dimethylphenol	1/8	ND - 6.0	0/5	ND
4-Methylphenol	1/8	ND - 4.0	0/5	ND
Phenol	1/8	ND - 2.0	0/5	ND
Inorganics				
Aluminum	5/8	ND - 4,210	5/5	81.1 - 3,130
Arsenic	1/8	ND - 2.2	1/5	ND - 2.8
Chromium	2/8	ND - 14.3	2/5	ND - 3.3
Copper	2/8	ND - 41.1	2/5	ND - 4.1
Iron	5/8	ND - 7,060	5/5	837 - 4,360
Lead	2/8	ND - 41.5	2/5	ND - 4.2
Manganese	5/8	ND - 314	5/5	24.4 - 664
Zinc	4/8	ND - 298	4/5	ND - 25.1

SAMPLES COLLECTED DURING RI
ALL REPORTED CONCENTRATIONS IN MICROGRAMS/LITER (Ig/l)
ND -- No DETECTION

TABLE 4 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE SURFACE WATER

Analytes	On-site Sampling Locations Frequency of Detection	On-site Sampling Locations Range of Concentrations	Off-site Sampling Locations Frequency of Detection	Off-site Sampling Locations Range of Concentrations
Volatile Organic Compounds				
Acetone	5/8	ND - 130	5/6	ND - 220
2-Butanone	1/8	ND - 37.0	2/6	ND - 39.0
1,1-Dichloroethane	1/8	ND - 4.0	0/6	ND
Semi-Volatile Organic Compounds				
Acenaphthene	0/8	ND	1/6	ND - 75.0
Anthracene	0/8	ND	1/6	ND - 81.0
Benzo(a)Anthracene	0/8	ND	2/6	ND - 200
Benzo(a)Pyrene	0/8	ND	1/6	ND - 140
Benzo(b)Fluoranthene	0/8	ND	2/6	ND - 280
Benzo(k)Fluoranthene	0/8	ND	2/6	ND - 250
Bis(2-Ethylhexyl)Phthalate	1/8	ND - 210	0/6	ND
Chrysene	0/8	ND	2/6	ND - 430
Di-n-Butylphthalate	4/8	ND - 2,000	0/6	ND
Fluoranthene	0/8	ND	2/6	ND - 860
Indeno(1,2,3-cd)Pyrene	0/8	ND	1/6	ND - 89.0
Phenanthrene	0/8	ND	1/6	ND - 280
Inorganics				
Aluminum	8/8	285 - 12,100	8/8	139 - 13,400
Arsenic	3/8	ND - 1.9	7/8	ND - 5.2
Chromium	8/8	1.1 - 15.8	8/8	0.26 - 11.9
Copper	8/8	0.98 - 17.0	8/8	0.39 - 8.8
Iron	8/8	207 - 3,940	8/8	107 - 10,100
Lead	8/8	2.0 - 29.6	8/8	0.86 - 28.2
Manganese	8/8	1.0 - 62.3	8/8	15.9 - 140
Zinc	7/8	ND - 56.8	7/8	ND - 294

SAMPLES COLLECTED DURING RI
ALL REPORTED CONCENTRATIONS IN MICROGRAMS/KILOGRAM (Ig/kg)
ND -- NO DETECTION

TABLE 5 RANGE AND FREQUENCY OF DETECTION OF ORGANIC CONTAMINANTS AND INORGANIC CONSTITUENTS DETECTED IN THE WETLANDS

Analytes	Frequency of Detection	Range of Concentrations
Volatile Organic Compounds		
Acetone	3/3	120 - 1,000
Benzene	2/3	ND - 1,200
2-Butanone	2/3	ND - 250
1,1-Dichloroethane	2/3	ND - 230
1,1-Dichoroethene	1/3	ND - 100
Methyl Chloride	1/3	ND - 41.0
Inorganics		
Aluminum	3/3	9,340 - 10,600
Arsenic	3/3	4.5 - 6.7
Chromium	3/3	7.6 - 9.9
Copper	3/3	9.6 - 10.5
Iron	3/3	3,190 - 6,820
Lead	3/3	28.5 - 59.6
Manganese	3/3	43.4 - 141
Zinc	2/3	ND - 129

SAMPLES COLLECTED DURING RI
ALL REPORTED CONCENTRATIONS IN MICROGRAMS/KILOGRAM (Ig/kg)
ND -- No DETECTION

TABLE 6 SUMMARY OF SOIL TESTING RESULTS FOR AOC#1

Compounds of Concern	Sampling Location B-1	B-2	B-2 (duplicate)	B-3	HA-1B
Surface Soils					
Total Antimony	NT	NT	NT	NT	2.2B
Antimony in TCLP Extract	NT	NT	NT	NT	0.0092B
Subsurface Soils					
Totals by 8260 and 8270 BN					
Acetone	0.030U	0.013JB	0.017JB	0.056B	NT
Benzoic Acid	0.17J	2.2U	2.2U	2.2U	NT
Bis(2-ethylhexyl)Phthalate	0.074J	0.2J	0.056J	0.16J	NT
1,1-Dichloroethene	0.006U	0.006U	0.006U	0.006U	NT
Methyl Chloride	0.004JB	0.005JB	0.005JB	0.005JB	NT
Tetrachloroethene	0.006U	0.006U	0.006U	0.006U	NT
1,1,1-Trichloroethane	0.006U	0.006U	0.006U	0.006U	NT
Trichloroethene	0.012U	0.012U	0.012U	0.011U	NT
TCLP Extract by 8260 and 8270 BN					
Acetone	0.008JB	0.016B	0.012B	0.012B	NT
Bis(2-ethylhexyl)Phthalate	0.012U	0.012U	0.012U	0.012U	NT
Chloroform	0.001U	0.001U	0.001U	0.003J	NT
1,1-Dichloroethene	0.0008U	0.00008U	0.0008U	0.0008U	NT
Methyl Chloride	0.097B	0.077B	0.11B	0.085B	NT
Tetrachloroethene	0.001U	0.001U	0.001U	0.001U	NT
1,1,1-Trichloroethane	0.0009U	0.0009U	0.0009U	0.0009	NT
Trichloroethene	0.0009U	0.0009U	0.0009U	0.0009U	NT

All Reported Concentrations in micrograms/liter (Ig/l)
NT -- Sample Not tested for this Analyte
TCLP -- Toxicity Characteristic Leaching Procedure
B -- Compound Detected in Laboratory Blank
J -- Detected Below Laboratory Detection Level, Estimated Value
U -- Result Below Method Quantitation Limits

TABLE 7 HISTORICAL LEVELS OF VOLATILE ORGANIC COMPOUNDS FOR WELLS AROUND FORMER SPRAY FIELD

Well	Sampling Date	Contaminant of Concern		
		1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane
MW-8	November '88	140J	170J	1,400
	July '92	97	90	170
	February '95	33	14	18
	September '96	21	26	15
	October '97	12	14	6
MW-9s	November '88	35	54	74
	July '92	36	49	58
	February '95	6.6	3.1	4
	September '96	10	8	12
	October '97	NA	NA	NA
MW-10	November '88	NA	NA	NA
	July '92	10	91	10
	February '95	0.8	< 0.5	< 0.5
	September '96	2	3	2
	October '97	2	4	1
MW-11s	November '88	NA	NA	NA
	July '92	190	110	340
	February '95	8.8	11	2.8
	September '96	9	9	4
	October '97	6	6	2

ALL CONCENTRATIONS REPORTED MICROGRAM/LITER (IG/L)
NA -- No AVAILABLE, WELL WAS NOT SAMPLED
J -- ESTIMATED VALUE

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TABLE 8 GROUNDWATER LEVEL DATA

Well #	Top of Casing Elevation (Above MSL)	Screen Interval	Depth to Water 12/10/96 or 1/9/97	Depth to Water 7/8/97	Depth to Water 10/22/97
MW-4	19.72	13 to 18	8.77	10.19	11.30
MW-8	17.15	~11 to 16	10.43	11.21	11.80
MW-9s	17.18	~11 to 16	9.21	10.10	Dry at 10.35
MW-9i	19.12	59.2 to 69.2	14.27	15.52	15.05
MW-10	15.92	~12 to 17	9.59	10.34	11.21
MW-11s	19.45	~10 to 15	9.47	10.64	11.86
MW-11i	21.03	64.5 to 74.5	5.72	16.71	16.43
MW-12s	17.19	4 to 14	4.3	7.13	8.10
MW-12i	17.14	65 to 75	8.32	9.58	9.7
MW-13	16.14	4 to 14	4.433	6.10	6.83
MW-14	16.75	4.5 to 14.5	5.92	7.41	8.14
MW-15	22.01	6 to 16	13.57	14.88	16.24
MW-16	10.02	6 to 16	NI/NM	NI/NM	6.85
MW-17	18.05	6 to 16	NI/NM	NI/NM	10.57
OW-1	14.84	5 to 15	5.67	NI/NM	7.38
OW-2	9.05	5 to 1.5	2.38	NI/NM	3.99

ALL MEASUREMENTS IN FEET
ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (MSL)
NI -- WELL NOT INSTALLED AS OF THIS DATE
NM -- NOT MEASURED ON THIS DATE

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<IMG SRC 98085E7>

Based on the above discussion, there are no unacceptable current risks associated with the Flanders Filters site and the only unacceptable future risks are associated with residents living on the Site or using the adversely impacted groundwater as their source of potable water.

The following factors were considered as part of this Ecological Risk Assessment:

- assess the components of biological communities on-site and in the vicinity, including vegetation, mammals, birds, reptiles, amphibians, and the aquatic biota;

- determine the location, extent, and characteristics of ecological resources on-site and in the vicinity that could serve as wildlife habitat or provide other ecological functions; and

- identify overt effects of contamination on biological communities.

The ecological assessment identified the following contaminants as potential environmental stressors:

acetone	aluminum	copper
benzene	arsenic	iron
bis(2-ethylhexyl)phthalate	chromium	lead
		zinc

These environmental stressors are present in on-site surface and subsurface soils, groundwater, and surface water and sediments; surface water and sediments found in Mitchell Branch; and in the wetlands located between the Site and Mitchell Branch. Of the constituents listed above, aluminum and zinc were identified as potential metals that could bioaccumulate in the aquatic ecosystem.

No metals were detected in Mitchell Branch or Tranters Creek above twice background concentrations. And no levels of volatile organics were detected above performance goals in Mitchell Branch. Due to the low levels of contaminants detected in the environment, only a slight potential exists that these contaminants would cause an adverse affect to the ecology. This determination is supported by the following observations 1) the diverse benthic macroinvertebrates inhabiting Mitchell Branch, 2) a wide variety of animal species on and around the Site, and 3) the lack of a visually stressed vegetation. The habitat around the Site has a high ecological value. Therefore, it is the Agency's determination that an active remediation in or around Mitchell Branch is not warranted.

7.0 REMEDIAL ACTION OBJECTIVES

Section 5.0 defined the extent and characterized the contamination and the environmental setting. Section 6.0 highlighted the human health and environmental risks posed by the Site. This Section specifies the remedial action objectives to protect human health and the environment. These remedial action objectives are warranted as actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment. Remedial action objectives are established to protect human health and the environment from each environmental media of concern by preventing exposures to concentrations of contaminants above risk-based human health or environmental standards. Protecting human health is achieved by either reducing exposure or reducing contaminant levels. Protection of the environment includes protection of natural resources for future uses.

In identifying the remedial action objectives, the findings of the Baseline Risk Assessment were used as well as an examination of all potential Federal and State environmental applicable or relevant and appropriate requirements (ARARs). ARARs are discussed in Sections 7.1 and 7.2.

The specific remedial action objectives and general response actions for the Flanders Filters site are:

- Remediate groundwater to the specified remediation levels;
- Limit the exposure of receptors to impacted groundwater; and
- Monitor contaminant levels in groundwater, surface water, and sediment to ensure the remedial action is protective of human health and the environment.

7.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Section 121(d) of CERCLA, as amended by Superfund Amendments and Reauthorization Act of 1986(SARA), requires that remedial actions comply with requirements or standards set forth under Federal and State environmental laws. The requirements that must be complied with are those laws that are applicable or relevant and appropriate to the (1) remedial action, (2) site location, and (3) media-specific contaminations at the Site.

"Applicable" requirements defined in 40 C.F.R.º 300.400(g)(1) are those requirements applicable to the release or remedial action contemplated based upon an objective determination of whether the requirements specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. These requirements would have to be met under any circumstance. "Relevant and Appropriate" requirements defined in 40 C.F.R.º 300.400(g)(2) are those requirements that address problems or situations sufficiently similar to the circumstances of the release or removal action contemplated, and whether the requirement is well suited to the Site.

ARARs are categorized as chemical-specific, action-specific, or location-specific. Chemical-specific ARARs are acceptable exposure levels to particular chemicals and is the limit that must be met for that contaminant within an environmental medium (i.e., water, soil, or air) at a specific compliance point. Action-specific requirements are controls or restrictions for particular activities related to the implementation of the remedial alternative. Location-specific ARARs address site-specific aspects such as a critical habitat upon which endangered species or threatened species depend, the presence of a wetland, or a historically significant feature.

TABLE 9 CURRENT AND FUTURE EXPOSURE PATHWAYS CONSIDERED IN THE BASELINE RISK ASSESSMENT

RELEASE MEDIA	ENVIRONMENTAL PATHWAY	EXPOSED POPULATION	EXPOSURE PATHWAY
CURRENT EXPOSURE PATHWAYS			
Groundwater	Groundwater Transport	Child + Adult Resident	Ingestion of Impacted Groundwater
Groundwater	Groundwater Transport	Child + Adult Resident	Dermal Contact with Groundwater
Groundwater	Volatilization	Child + Adult Resident	Inhalation of VOCs
Surface Water	Groundwater Transport	On-site Worker, Site Trespasser	Ingestion of Impacted Surface Water
Surface Water	Groundwater Transport	On-site Worker, Site Trespasser	Dermal Contact with Surface Water
Soil(Surface + Subsurface)	Direct Contact with Impacted Soils	On-site Worker, Site Trespasser	Incidental Ingestion of Impacted Soils
Soil(Surface + Subsurface)	Direct Contact with Impacted Soils	On-site Worker, Site Trespasser	Dermal Contact With Impacted Soils
Sediment Sediment	Direct Contact with Impacted Sediment	On-site Worker, Site Trespasser	Incidental Ingestion of Impacted
Sediment Sediment	Direct Contact with Impacted Sediment	On-site Worker, Site Trespasser	Dermal Contact with Impacted
FUTURE EXPOSURE PATHWAYS			
Groundwater	Groundwater	Child + Adult Resident	Ingestion of Impacted Groundwater
Groundwater	Groundwater	Child + Adult Resident	Dermal Contact with Groundwater
Groundwater	Volatilization	Child + Adult Resident	Inhalation of VOCs
Surface Water	Groundwater Transport	Child + Adult Resident	Ingestion of Impacted Surface Water
Surface Water	Groundwater Transport	Child + Adult Resident	Dermal Contact with Surface Water
Soil (Surface + Subsurface)	Direct Contact with Impacted Soils	Child + Adult Resident	Incidental Ingestion of Impacted Soils
Soil (Surface + Subsurface)	Direct Contact with Impacted Soils	Child + Adult Resident	Dermal Contact with Impacted Soils
Sediment	Direct Contact with Impacted Sediment	Child + Adult Resident	Incidental Ingestion of Impacted Sediments
Sediment	Direct Contact with Impacted Sediment	Child + Adult Resident	Dermal Contact with Impacted Sediments

TABLE 10 SUMMARY OF CUMULATIVE HEALTH RISK BASED ON THE BASELINE RISK ASSESSMENT

	CARCINOGENIC RISK	NON-CARCINOGENIC RISK
ON-SITE WORKER	Within Acceptable Risk Range Risk - 8.2 x 10 -6	Within Acceptable Risk Range HQ = 0.62
SITE TRESPASSER	Within Acceptable Risk Range Risk - 9.5 x 10 -7	Within Acceptable Risk Range HQ = 0.04
CHILD RESIDENT (CURRENT)	Just Within Acceptable Risk Range Risk - 5.9 x 10 -5 Risk due to Contaminants in Groundwater	Unacceptable Risk HQ = 5.7 Risk due to Contaminants in Groundwater
ADULT RESIDENT (CURRENT)	Just Within Acceptable Risk Range Risk - 8.5 x 10 -4 Risk due to Contaminants in Groundwater	Unacceptable Risk HQ = 7.6 Risk due to Contaminants in Groundwater
CHILD RESIDENT (FUTURE)	Just Within Acceptable Risk Range Risk - 6.2 x 10 -4 Risk due to Contaminants in Groundwater	Unacceptable Risk HQ = 2.4 Risk due to Contaminants in Groundwater
ADULT RESIDENT (FUTURE)	Just Within Acceptable Risk Range Risk - 8.6 x 10 -4 Risk due to Contaminants in Groundwater	Unacceptable Risk HQ = 2.6 Risk due to Contaminants in Groundwater

HQ -- Hazardous Quotient

The chemical-, action-, and location-specific ARARs for the selected and contingent remedial alternatives are listed in Table 11. The chemical-specific ARARs are further discussed in Section 7.2 PERFORMANCE STANDARDS.

7.2 PERFORMANCE STANDARDS

Based on the discussions in Sections 5.2 and 6.0, it is evident that Site soils do not need to be remediated. Section 6.0 also provides the rationale, taken from the Ecological Risk Assessment, supporting the Agency's decision not to implement an active remediation alternative for addressing the limited contamination in Mitchell Branch and its associated wetlands. Table 12 provides the groundwater performance standards. Because the concentration of 1,1-DCE in on-site surface water exceeds North Carolina's surface water standard, 1,1-DCE was incorporated into Table 13 which provides the surface water performance standard for the Flanders Filters site. These performance standards are based on the identified ARARs.

8.0 DESCRIPTION OF ALTERNATIVES

Table 14 presents the results of the final screening of the remediation technologies. Effectiveness, implementability, and relative capital and operation and maintenance costs are the criteria used in the evaluation.

The four (4) remediation alternatives retained are described below.

8.1 REMEDIAL ALTERNATIVES

Alternative RAA1: No Action

Alternative RAA2: Monitored Natural Attenuation, Sample Private Wells in the Shad Bend Community, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

Alternative RAA3: Limited Groundwater Extraction with Discharge to Mitchell Branch via an NPDES Permit, Sample Private Wells in the Shad Bend Community, Monitoring, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

Alternative RAA4: Air Sparging with Soil Vapor Extraction, Sample Private Wells in the Shad Bend Community, Monitoring, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

The cost information below represents the estimated Total Present Worth of each alternative. Total present worth was calculated by combining the capital cost plus the present worth of the annual operating and maintenance costs. Capital cost includes construction, engineering and design, equipment, and site development. Operating costs were calculated for activities that continue after completion of construction, such as routine operation and maintenance of treatment equipment, and monitoring. The present worth of an alternative is the amount of capital required to be deposited at the present time at a given interest rate to yield the total amount necessary to pay for initial construction costs and future expenditures, including operation and maintenance (O&M) and future replacement of capital equipment. A 7 percent discount rate was used to calculate the Present Worth Operation & Maintenance Costs.

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TABLE 11 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
ARAR EVALUATION

REQUIREMENTS	CODIFICATION	DESCRIPTION	Applicable	Relevant + Appropriate	To Be Considered
STATE Action-Specific ARARs					
Natural Attenuation					
North Carolina Groundwater Quality Standards	15A NCAC 2L	Requirements for groundwater standards based on aquifer classifications	Yes		
North Caroline Water Quality Standards	15A NCAC 2B	Requirements for surface water quality	Yes		
Land Use Restrictions	15A NCAC 13C 130A-310.3(f)	Statute allowing State to accept land use restrictions	Yes		
Deed Recordation	15A NCAC 2C-0108	Statute allowing deed Recordation	Yes		
Well Abandonment	15A NCAC 2C.0108	Statute regulating well construction + abandonment	Yes		
Groundwater Treatment					
North Carolina Air Pollution Control Requirements	15A NCAC 2D	Emission standards that may apply to remedial systems	Yes		
Land Use Restrictions	15A NCAC 13C 130A-310.8	Statute allowing State to accept land use restrictions	Yes		
Deed Recordation	15A NCAC 13C 130A-310.8	Statute allowing deed recordation	Yes		
Well Abandonment	15A NCAC 2C.0108	Statue regulating well construction + abandonment	Yes		
LOCAL Action-Specific ARARs					
Deed Recordation		Deed recordation by Register of Deeds	Yes		
FEDERAL Location-Specific ARARs					
Federal Endangered Species Act	50 CAR 200 + 402	Establishes actions to avoid jeopardizing the existence of listed endanger species or their habitats		Yes	

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TABLE 12 GROUNDWATER PERFORMANCE STANDARDS AND CORRESPONDING RISKS

CHEMICAL OF CONCERN	RANGE AND FREQUENCY( )OF DETECTION (Ig/l)	PERFORMANCE STANDARDS (CLEANUP GOALS)	POINT OF COMPLIANCE	CORRESPONDING RISK LEVEL		
				BASIS OF STANDARD	CARCINOGENIC RISK	NON-CARCINOGENIC RISK
VOLATILE ORGANIC COMPOUNDS						
Chloroform (Trihalomethanes)	ND - 0.4(7/36)	0.19	Throughout Entire Plume	NCAC 2L	1.54 x 10 -4	HQ = 0.001
1,1-Dichloroethene	ND - 73.0(22/36)	7.0	Throughout Entire Plume	MCL/NCAC 2L	5.67 x 10 -5	HQ = 0.05
Tetrachloroethene	ND - 5.0(3/36)	0.7	Throughout Entire Plume	NCAC 2L	4 x 10 -7	HQ = 0.004
1,1,1-Trichloroethane	ND - 600(9/36)	200	Throughout Entire Plume	MCL/NCAC 2L	NA	HQ = 0.56
Trichloroethene	ND - 14(15/36)	2.8	Throughout Entire Plume	NCAC 2L	4 x 10 -7	HQ = 0.03
Vinyl Chloride	ND - 6.0(3/36)	0.015	Throughout Entire Plume	NCAC 2L	3 x 10 -7	NA
INORGANICS						
Aluminum	ND - 12,100(20/29)	15,714	Throughout Entire Plume	HQ	NA	HQ = 1
Antimony	ND - 21.1(1/29)	6	Throughtout Entire Plume	MCL	NA	HQ = 1
Arsenic	ND - 6.5(3/29)	50	Throughout Entire Plume	MCL/NCAC 2L	7.05 x 10 -4	
Iron	ND - 9,840(28/29)	300	Throughout Entire Plume	MCL/NCAC 2L	NA	HQ = 0.06
Managanese	ND - 508(23/29)	50	Throughout Entire Plume	MCL/NCAC 2L	NA	HQ = 0.15

Ig/l -- microgram per liter or parts per billion
HQ -- Hazard Quotient
MCL -- Maximum contaminant Level as specified in the Safe Drinking Water Act
NCAC 2L -- North Carolina Administrative Code specifying State Groundwater Classification & Standards
NA -- Not applicable
ND -- Not Detected

TABLE 13 SURFACE WATER PERFORMANCE STANDARDS AND CORRESPONDING RISKS

CHEMICAL OF CONCERN	RANGE AND FREQUENCY( )OF DETECTION (Ig/l)	PERFORMANCE STANDARDS (CLEANUP GOALS)	POINT OF COMPLIANCE	BASIS OF STANDARD	CORRESPONDING RISK LEVEL CARCINOGENIC RISK	NON-CARCINOGENIC RISK
VOLATILE ORGANIC COMPOUNDS						
1,1-Dichloroethene	ND - 133.0 (7/13)	3.2	At Surface Water Sampling Locations SW-5 and SW-11	NCAC 2B	1.28 x 10 -5	HQ = 0.007

Ig/l -- microgram per liter or parts per billion
HQ -- Hazard Quotient
NCAC 2B -- North Carolina Administrative Code specifying State Surface Water Classifications & Standards
ND -- Not Detected

TABLE 14 FINAL SET OF REMEDIAL ACTION TECHNOLOGIES AND PROCESS OPTIONS

Environmental Media	General Response	Remediation Technology	Process Option
Groundwater	No Action	No Action with Monitoring	Not applicable
	Institutional Controls	Deed controls	Deed restriction and recordation
		Monitoring	Surface water monitoring
	Collection Actions	Limited Groundwater Extraction	Extraction wells
	Ex-situ Treatment	Physical/Chemical Treatment	Air stripping
	In-situ Treatment	Air Sparging	Air sparging with soil vapor extraction
		Monitored Natural Attenuation	Natural Attenuation
	Discharge Actions	Off-site	Surface water (NPDES)

8.1.1 ALTERNATIVE RAA1: No Action

The No Action alternative is included, as required by CERCLA, to establish a baseline for comparing the benefits achieved by the other remediation alternatives. Under this alternative, no cleanup activities would be implemented (i.e., the Site is left "as is"). Because this alternative does not actively remove or destroy contaminants, hazardous materials would remain on Site requiring a review of the Site's remedy every five years in accordance with CERCLA Section 121(c). Therefore, semi-annual groundwater and surface water monitoring would be performed in preparation to develop the Five-Year Review document. The analytical results would also be compared to the predicted plume behavior produced by Bioscreen model which was performed as part of the FS. This review process will continue every five years until the performance standard (cleanup goal) for the identified contaminants (Table 12) in the groundwater are achieved. The implementation of this remedy could begin immediately and would have no negative impact on future remedial actions.

Since no action is taken, migration of contaminants in the groundwater will continue. This migration results from the natural movement of precipitation (e.g., rain and melted snow) moving through the overlying formation and the natural movement of groundwater in the aquifer. Although Alternative RAA1 does not actively reduce or eliminate contamination, it is anticipated that the levels of the contaminants will decrease over time due to the process of natural attenuation. Based on the Bioscreen model, using a first order of decay, it was estimated to take approximately 9 years for the levels of organic contaminants in the groundwater to decline to their clean-up levels.

There is a minimal capital cost associated with Alternative RAA1. The capital cost is for the development of a work plan for preparing Five-Year Review Reports and the monitoring activities necessary for the preparation of these reports. Operating & Maintenance Costs are associated with periodic monitoring of the Site in order to prepare the Five-Year Review Reports. As part of the five year review, groundwater and surface water samples will be initially collected for chemical analyses on a semi-annual basis, however, as the data base builds, the sampling frequency may be modified.

Capital Costs:	$ 8,000
Present Worth Operating & Maintenance Costs:	$256,000
Total Present Worth Costs:	$264,000
Time to Design:	None
Construction Time:	None

8.1.2 ALTERNATIVE RAA2: Monitored Natural Aftenuation, Sample Private Wells in Shad Bend Community, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

"Monitored natural attenuation" relies on natural attenuation processes to achieve site-specific remedial objectives within a time frame that is reasonable compared to that offered by other more active methods. The "natural attenuation processes" that are at work in a remediation approach include a variety of physical, chemical, and/or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; and chemical or biological stabilization, transformation, or destruction of contaminants.

Groundwater and surface water quality will be initially monitored, at a minimum, on a semi-annual basis. In addition to analyzing the groundwater for VOCs, SVOCs, and inorganics (as needed), the groundwater will also be monitored on a periodic basis for natural attenuation parameters. The Draft EPA Region 4 Suggested Practices for Evaluation of a Site For Natural Attenuation (Biological Degradation) of Chlorinated Solvents, November, 1997, Version 3.0 is to be used for guidance, as amended. The data generated from this monitoring effort will be used to 1) insure that the contaminants are not migrating further than predicted (Bioscreen model), 2) develop and maintain a data base that confirms and verifies that natural attenuation is occurring, and 3) compare the testing results to the predicted plume behavior generated by a fate and transport model. Water levels will be measured in all monitoring wells on a quarterly basis until any seasonal perturbations in the groundwater flow direction have been established. As a part of this remedy and to confirm the time frame (estimated to be 9 years) to achieve the groundwater performance standards across the entire Site, a fate and transport model, using Bioplume II, RT3D, or equivalent, will be conducted to predict plume behavior over time. To assist with this modeling effort, an additional groundwater monitoring well will be installed downgradient of MW-14, approximately 400 feet to the southeast.

Flanders Filters, Inc. verified the week of August 24, 1998 that one of the residents in the Shad Bend community use their private well as their source of potable water. Consequently, to confirm that the groundwater underlying the Shad Bend community has not been adversely impacted by Site activities, all existing wells in the Shad Bend community need to be sampled. The sampling of these wells shall be incorporated into the overall groundwater monitoring strategy to be developod during the Remedial Design phase.

The institutional controls to be implemented as part of this alternative include "land use restrictions" and "deed recordation". The ability to implement these two institutional controls is codified under 15A NCAC 13C 130A-310.3(f) and 15A NCAC 13C 130A-310.8, respectively. The land use restriction will contain language to accomplish the following three objectives: 1) restrict future land use which would decrease the likelihood of human exposure to contaminants in the soils, 2) prevent the installation of a potable well at the Site until the levels of contamination in the groundwater under the Site are deemed safe, and 3) prevent excavation in contaminated soils without sufficient personal protection for the workers. The deed recordation will contain language that will inform any potential buyer of the property of the contamination present. The suitable land use restrictions and deed recordation shall be recorded in the appropriate state, county, and/or local office(s).

In an effort to prevent any migration of contaminants into the lower aquifer, the four inactive supply wells will be abandoned in accordance to North Carolina regulation NCAC, Title 15A, Subchapter 2C, Section .0100, Subsection .0113 -Abandonment of Wells. To reduce future liability, all of the aboveground storage tanks in area AOC#5 will be removed. After their removal, the surrounding and underlying soils will be visually inspected and sampled.

As with Alternative RAA1, Five-Year Review Reports will be prepared until all performance standards are obtained across the entire Site.

Capital Costs:	$88,000
Present Worth Operating & Maintenance Costs:	$298,000
Total Present Worth Costs:	$386,000
Time to Design:	3 months
Construction Time:	N/A
Duration to Achieve Clean-up:	9 years

8.1.3 ALTERNATIVE RAA3: Limited Groundwater Extraction with Discharge to Mitchell Branch via an NPDES Permit, Sample Private Wells in Shad Bend Community, Monitoring, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

This alternative employs extraction wells in two areas of the Site to remove contaminated groundwater from the shallow aquifer. It was estimated that two extraction wells would be installed in the vicinity of AOC #1 and a row of six extraction wells would be installed between the Former Ponds 1 & 2 and the leach field. Extracted groundwater would be piped to an on site air stripping unit and discharged to Mitchell Branch in accordance with an National Pollutant Discharge Elimination System (NPDES) permit. Additional treatment of extracted groundwater, such as pH adjustment and metals removal, may be necessary in order to the achieve discharge limits established in the NPDES permit. Due to the low levels of emissions expected from the air stripping unit, the vapors would be discharged to the atmosphere and no air discharge permit is expected to be required. These details would be confirmed during the RD phase.

As other impacted areas of the aquifer would be allowed to naturally attenuate, all of the requirements/activities incorporated into Alternative RAA2 (i.e,. sampling of wells in the Shad Bend community, institutional controls, the abandonment of the inactive public supply wells, and preparation of Five-Year Review reports) would also be implemented as part of Alternative RAA3 with the exception of running a fate and transport model. The estimated time frame to achieve the performance standards for this alternative is 8 years.

Capital Costs:	$ 441,000
Present Worth Operating & Maintenance Costs:	$ 763,000
Total Present Worth Costs:	$1,204,000
Time to Design:	10 months
Construction Time:	8 months
Duration to Achieve Clean-up:	8 years

8.1.4 ALTERNATIVE RAA4: Air Sparging with Soil Vapor Extraction, Sample Private Wells in Shad Bend Community, Monitoring, Institutional Controls, Abandonment of Inactive Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

This alternative involves the installation/operation of an air sparging/soil vapor extraction system in the same two areas identified in Alternative RAA3. Air sparging technology injects air into the saturated zone through air sparging point wells in order to transfer the volatile organic compounds from the liquid phase to the gaseous phase. The vapors are then removed by the pull of a vacuum created in the vadose zone soils through the soil vapor extraction points. Due to the low levels of emissions expected, the vapors would be discharged to the atmosphere and no air discharge permit is expected to be required. These details would be confirmed during the RD phase. The estimated time frame to achieve the performance standards for this alternative is 8 years.

As other impacted areas of the aquifer would be allowed to naturally attenuate, all of the requirements/activities incorporated into Alternative RAA2 (i.e,. sampling of wells in the Shad Bend community, institutional controls, the abandonment of the inactive public supply wells, and preparation of Five-Year Review reports) would also be implemented as part of Alternative RAA4 with the exception of running a fate and transport model. The estimated time frame to achieve the performance standards for this alternative is 8 years.

Capital Costs:	$ 419,000
Present Worth Operating & Maintenance Costs:	$ 584,000
Total Present Worth Costs:	$1,003,000
Time to Design:	10 months
Construction Time:	8 month
Duration to Achieve Clean-up:	8 years

9.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 8.0 describes the remedial alternatives set forth in the March 1998 FS document. This section summarizes the detailed evaluation of the four remediation alternatives in accordance with the nine (9) criteria specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Section 300.430(e)(9)(iii). This evaluation, in accordance with the nine criteria, is summarized in Table 15.

9.1 THRESHOLD CRITERIA

In order for an alternative to be eligible for selection, it must be protective of both human health and the environment and comply with ARARs. However, the requirement to comply with ARARs can be waived in accordance to 40 CFR Section 300.430(f)(1)(ii)(C).

9.1.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion assesses the alternatives to determine whether they can adequately protect human health and the environment from unacceptable risks posed by the contamination at a Site. This assessment considers both the short-term and long-term time frames.

As stated in Section 6.0, under both current and future conditions, the contaminants in the soils at the Site do not pose an unacceptable risk to human health. Based on the findings of the Ecological Risk Assessment, the Site has not caused any visible harm to the environment. Use of the groundwater as a source of potable water under both current and future resulted in unacceptable risks. The risks associated with these two scenarios (for children) are 5.9 x 10 -4 and 6.2 x 10 -4, respectively. The Hazardous Quotients for these two scenarios are 5.7 nd 7.6, respectively. However, the Site is an active industrial facility and since contaminated groundwater has not migrated beyond Site boundary's, except for the groundwater discharging into surface water, the current risk does not apply. The Flanders Filters facility and all residents but one in the Shad Bend community received their potable water from the City of Washington. Therefore, the remedial decision is based on protecting groundwater for current and future use.

Alternatives RAA1 and RAA2 rely on natural attenuation processes exclusively. Alternatives RAA3 and RAA4 utilize established groundwater remediation technologies, groundwater extraction and air sparging/soil vapor extraction, respectively, to augment the passive natural attenuation process.

The extent of the groundwater impact is believed to have been reached at the Site. The plume has migrated to the edge of Mitchell Branch, which is acting as a discharge boundary or hydraulic divide to the groundwater flowing from the Site to the east. Therefore, the groundwater plume will not migrate beyond Mitchell Branch. When comparing the estimated time frames to achieve performance standards (cleanup goals), all four alternatives, are expected to provide long-term protection for human health and the environment. To insure that each alternative is protective, each alternative includes a monitoring program.

Under Alternatives RAA1, RAA2, and to some degree Alternatives RAA3 and RAA4, contaminant levels are anticipated to decrease as a result of natural attenuation. Alternatives RAA3 and RAA4 may be considered more protective of the environment by removing contaminants from the soil/groundwater, thereby reducing the potential for migration of contaminants to groundwater and eventually to Mitchell Branch. However, because of Site conditions and technology limitations, Alternatives RAA3 and RAA4 are only projected to remediate the Site in a slightly shorter time frame than either Alternative RAA 1 or Alternative RAA2. Therefore, Alternatives RAA3 and RAA4 do not provide significant additional protection to human health and the environment than Alternative RAA 1 or Alternative RAA2.

Alternatives RAA2, RAA3, and RAA4 include deed restriction and recordation. These institutional controls are designed to restrict the aquifer to non-potable use and record areas of the aquifer above groundwater standards until such time as groundwater standards are achieved. These three alternatives also include abandonment of the inactive public supply wells which will keep additional contamination from migrating into the lower aquifer.

9.1.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This criterion assesses the alternatives to determine whether they attain ARARs under federal and state environmental laws, or provide justification for waiving an ARAR. No waiver for an ARAR is currently anticipated. Site specific ARARs are identified in Table 11.

MCLs and State groundwater quality standards are ARARs for Site groundwater. It is anticipated that all of the alternatives will obtain performance standards for groundwater and surface water at the point of compliance specified in Tables 12 and 13, respectively. All four RAAs are expected to comply with State and Federal chemical-, location-, and action-specific ARARs that were established for this Site.

9.2 PRIMARY BALANCING CRITERIA

These ciriteria are used to evaluate the overall effectiveness of a particular remedial alternative.

9.2.1 LONG-TERM EFFECTIVENESS AND PERMANENCE

This criterion assesses the long-term effectiveness and permanence an alternative will afford as well as the degree of certainty to which the alternative will prove successful.

All of the alternatives are designed to accomplish long-term effectiveness and permanence and rely, to some degree on natural attenuation. Alternatives RAA2, RAA3, and RAA4 include monitoring as part of natural attenuation. Alternatives RAA3 and RAA4 augment natural attenuation with active cleanup systems at the two areas with the highest VOC concentrations in the groundwater. Each alternative includes a ground water and surface water testing program to gather data on the effectiveness and permanence of the remedy. The estimated time frame to meet the performance standards with Alternatives RAA1 and RAA2 is nine years. For Alternatives RAA3 and RAA4, the expected time frame is eight years. Five-year CERCLA mandated reviews will be required for all of the alternatives.

9.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

This criterion assesses the degree to which the alternative employs recycling or treatment to reduce the Toxicity, Mobility or Volume of the contaminants present at the Site.

Alternatives RAA3 and RAA4 actively reduce the toxicity, mass, and volume of contaminants in the groundwater and satisfy the statutory preference for treatment. However, natural attenuation processes will also reduce the toxicity, mobility, or volume of the plume through natural processes. In addition, no treatment residuals are generated by Alternatives RAA1 and RAA2, as there could be with Alternatives RAA3 and RAA4.

9.2.3 SHORT-TERM EFFECTIVENESS

This criterion assesses the short-term impact of an alternative to human health and the environment. The impact during the actual implementation of the remedial action is usually centered under this criterion.

Alternatives RAA1 and RAA2 pose fewer short-term risks to Site workers and the community than either Alternative RAA3 or RAA4. Alternatives RAA3 and RAA4 may create more short-term risk due to the invasive nature of the system installation. Alternatives RAA3 and RAA4 also pose risks to receptors due to the long-term operation and maintenance of the active remediation systems.

9.2.4 IMPLEMENTABILITY

This criterion assesses the ease or difficulty of implementing the alternative in terms of technical and administrative feasibility and the availability of services and materials.

Alternative RAA1 requires no implementation. Alternative RAA2 will be easy to implement as minimal construction is required. Both Alternatives RAA3 and RAA4 are projected to require approximately 12 months to design and construct, and approximately 8 years of operation. Alternative RAA3 will require the acquisition of a NPDES permit. The design of the treatment system for Alternative RAA3 cannot be completed until the discharge requirements of the NPDES permit are established. The design for Alternative RAA4 cannot be completed until after a pilot study is performed. The pilot study is necessary to determine the radius of influence around each air sparging and vapor extraction well. This typically occurs during the RD.

TABLE 15 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

EVALUATION CRITERIA	REMEDIAL ACTION ALTERNATIVES RAA1: No Action	RAA2: Monitored Natural Attenuation	RAA3: Limited Groundwater Extraction	RAA4: Air Sparging with Soil Vapor Extraction
Overall Protectiveness				
Human Health	Natural attenuation is expected to continue to reduce COC levels, VOC monitoring of groundwater and surface water to ensure protection of human health	Natural attenuation is expected to continue to reduce COC levels, and reduce exposure; periodic monitoring of groundwater and surface water to ensure protection of human health; deed restriction and recordation to limit land use to industrial with no aquifer use	Is protective of human health by reducing levels of COCs in groundwater; groundwater monitoring to ensure protection of human health	Is protective of human health by reducing levels of COCs in groundwater, groundwater monitoring to ensure protection of human health
Environment	Natural attenuation is expected to continue to reduce COC levels, VOC monitoring of surface water to ensure protection of the environment	Natural attenuation is expected to continue to reduce COC levels and reduce impacts to ecological receptors; periodic monitoring of surface water to ensure protection of the environment	Is protective of the environment by containing plume and reducing levels of COCs in groundwater; surface water monitoring to ensure protection; VOCs emitted to atmosphere	Is protective of the environment by reducing levels of COCs in groundwater, surface water monitoring to ensure protection; VOCs emitted to atmosphere
Compliance With Applicable or Relevent and Appropriate Requirements				
Chemical-Specific ARARs	ARARs are expected to be met overtime, monitoring of VOCs to ensure compliance with ARARs	ARARs are expected to be met based on natural attenuation, monitoring of attenuation indicator parameters and VOCs to ensure compliance with ARARs	The use of pump and treat in the areas of greatest groundwater impact and natural attenuation in other areas of the Site will meet ARARs	The use of air sparging/SVE in the areas of greatest groundwater impact and natural attenuation in other areas will meet the ARARs
Action-Specific ARARs	N/A	Can be designed to meet these ARARs	Can be designed to meet these ARARs	Can be designed to meet these ARARs
Location-Specific ARARs	N/A	Can be designed to meet these ARARs	Can be designed to meet these ARARs	Can be designed to meet these ARARs

TABLE 15 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

EVALUATION CRITERIA	REMEDIAL ACTION ALTERNATIVES RAA1: No Action	RAA2: Monitored Natural Attenuation	RAA3: Limited Groundwater Extraction	RAA4: Air Sparging with Soil Vapor Extraction
Long-Term Effectiveness and Permanence				
Adequacy and Reliability of Controls	High; groundwater and surface water will be monitored in accordance to an approved work plan for monitoring activities in preparation of the Five Year Review Report	High; groundwater and surface water will be monitored in accordance to an approved work plan, deed recordation and restrictions will document plume and prevent aquifer use	High; groundwater and surface water will be monitored in accordance to an approved work plan, deed recordation and restrictions will document plume and prevent aquifer use	High; groundwater and surface water will be monitored in accordance to an approved work plan, deed recordation and restrictions will document plume and prevent aquifer use
Need for Five-Year Review	Would be required to ensure adequate protection of human health and the environment	Would be required to ensure adequate protection of human health and the environment until remediation goals are achieved	Only needed until remediation goals are achieved	Only needed until remediation goals are achieved
Reduction of Toxicity, Mobility, and Volume Through Treatment				
Treatment Technology/ Process Used	Natural attenuation by physical, chemical, and/or biological processes	Natural attenuation by physical, chemical, and/or biological processes	Active groundwater extraction, treatment, and discharge via NPDES permit for areas of greatest impact, natural attenuation for remainder of shallow aquifer	Active AS/AVE for extraction of VOCs and discharge to atmosphere in areas of greatest impact, natural attenuation for remainder of shallow aquifer
Amount of Contaminants Treated or Destroyed	COCs removed from aquifer by natural attenuation processes	COCs removed from aquifer by natural attenuation processes	Contaminants removed from aquifer, treated by air stripping tower; residual and fringe areas to be degraded in-situ by natural attenuation	Contaminants transferred to atmosphere through AS/SVE process or degraded in situ by natural attenuation

TABLE 15 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

EVALUATION CRITERIA	REMEDIAL ACTION ALTERNATIVES RAA1: No Action	RAA2: Monitored Natural Attenuation	RAA3: Limited Groundwater Extraction	RAA4: Air Sparging with Soil Vapor Extraction
Treatment Residuals	None	None	Some water treatment sludge generated by air stripping, VOCs discharged to atmosphere, no residuals from naturally attenuated areas	VOCs discharged to the atmosphere, no residuals from naturally attenuated areas
Reduction of Toxicity Mobility, or Volume	Parameters of concern will decline over time via natural attenuation	Parameters of concern will decline over time via natural attenuation	Mobility of COCs in most contaminated areas is reduced more than other methods, all parameters will decline over time	Removal of VOCs from most contaminated zones relatively quickly, parameters in other areas attenuate over time
Short-Term Effectiveness				
Community Protection	No increase in exposures by this alternative	No increase in exposures by this alternative	Potential increase in exposure during construction and operation	Potential increase in exposure during construction and operation
Worker Protection	Potential risk to monitoring personnel, reduced by proper health and safety procedures	Potential risk to monitoring personnel, reduced by proper health and safety procedures	Risks to workers will be increased by invasive nature of system and the construction and operation of groundwater treatment system	Risks to workers will be increased by invasive nature of system and the construction and operation of the groundwater treatment system
Impact to Environment	No additional impacts expected by implementation	No additional impacts expected by implementation	No additional impacts expected by implementation	No additional impacts expected by implementation
Time Frame for Completion	Estimated to be 9 years	Estimated to be 9 years	Estimated to be 8 years	Estimated to be 8 years

TABLE 15 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

EVALUATION CRITERIA	REMEDIAL ACTION ALTERNATIVES RAA1: No Action	RAA2: Monitored Natural Attenuation	RAA3: Limited Groundwater Extraction	RAA4: Air Sparging with Soil Vapor Extraction
Implementability				
Capability to Construct and Operate	Totally capable	Totally capable	Established implementation methods; however, proximity of septic field may pose problems with greater than normal biogrowth in the well screen; discharge line installed over long distance	Established implementation methods; however, proximity of septic field may pose problems with greater than normal biogrowth in sparge/extraction well screens
Reliability of Technology-Availability of Equipment	Natural attenuation processes acting on chlorinated VOCs is an emerging technology; methods to monitor VOCs readily available, new EPA directive on process	Natural attenuation processes acting on-chlorinated VOCs is an emerging technology; methods to monitor processes are proposed in EPA documents	Reliable technology, but has not proven to be successful in completing cleanup of dissolved plumes to low ppb levels; equipment is readily available	Reliable technology; equipment/services readily available; high water table conditions can cause system shut-down; aerobic conditions may kill anaerobic bacteria documented to be reducing VOCS
Ability to Monitor Effectiveness/ Increase Remedial Action	VOCs monitoring plan to be implemented; additional remedial actions simple to initiate	Comprehensive natural attenuation and VOC monitoring plan to be implemented; additional remedial actions simple to initiate	Comprehensive natural attenuation and VOC monitoring plan to be implemented; additional remedial actions simple to initiate	Comprehensive natural attenuation and VOC monitoring plan to be implemented; additional remedial actions simple to initiate
Agency Coordination	Negligible requirements	Moderate requirements	Moderate to high requirements, NPDES permit required, air registration possible	Moderate to high requirements, air discharge registration possible
Cost (Net Present Worth)	$264,000	$386,383	$1,204,327	$1,002,845

9.2.5 COST

This criterion assesses the cost of an alternative in terms of total present worth cost (PW). Calculation of the total PW is described in Section 8.1. The total present worth costs for the alternatives are presented below:

Alternative RAA1 - No Action: $ 264,000

Alternative RAA2 - Monitored Natural Attenuation, Sample Private Wells in Shad Bend Community, Institutional Controls, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $386,000

Alternative RAA3 - Limited Groundwater Extraction with Discharge to Mitchell Creek via a NPDES Permit, Sample Private Wells in Shad Bend Community, Monitoring, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $1,204,000

Alternative RAA4 - Air Sparging with Soil Vapor Extraction, Sample Private Wells in Shad Bend Community, Monitoring, & Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $1,003,000

9.3 MODIFYING CRITERIA

State and community acceptance are modifying criteria that shall be considered in selecting the remedial action.

9.3.1 STATE OF NORTH CAROLINA ACCEPTANCE

The State of North Carolina has reviewed and provided EPA with comments on the reports and data from the RI and the FS. NCDENR has also reviewed the Proposed Plan and EPA's preferred alternative as well as this ROD and conditionally concurs with the selected remedy as described in Section 10. The State's correspondence providing conditional concurrence, along with the specific conditions, and the Agency's response to the stipulated conditions can be found in Appendix A.

9.3.2 COMMUNITY ACCEPTANCE

The Proposed Plan Fact Sheet was distributed to interested residents, to local newspapers and radio and TV stations, and to local, State, and Federal officials on June 19, 1998. The Proposed Plan public meeting was held in the evening of June 23, 1998. The public comment period on the Proposed Plan began June 23, 1998 and closed on July 23, 1998.

The only written comments received during the public comment period were from Duncklee & Dunham, P.C., Flanders Filters, Inc.'s contractor. The questions asked during the June 23, 1998 public meeting and the Agency's response to the written comments are summarized in the Responsiveness Summary, Appendix C. No input was received from the community at large, therefore it is not feasible to assess the community's acceptance of the proposed remedy.

10.0 DESCRIPTION OF THE SELECTED REMEDY

Alternative RAA2 is the selected remedial alternative for the Flanders Filters site with Alternative RAA4 as the contingent remedial alternative. In the event data collected from the Site cannot substantiate the occurrence of natural attenuation, the contingency remedy will be immediately implemented. This decision will be made within three years after the issuance of this Record of Decision.

10.1 PERFORMANCE STANDARDS TO BE ATTAINED

Table 11 lists the action-specific, chemical-specific, and location-specific Site specific ARARs. Tables 12 and 13 list the performance standards for the groundwater and surface water, respectively. The select remedial alternative or the contingent remedial alternative will achieve all ARARs.

Table 12 provides the remediation goals to be achieved in the groundwater at the Site. This table also highlights the range and frequency of detection for the contaminants of concern detected at the Site. This table also lists the risk level associated with each remediation goal. These risks were calculated in the Baseline Risk Assessment.

10.2 DESCRIPTION OF SELECTED REMEDIAL ACTION

The remedial alternative selected for the Flanders Filters site is RAA2 - Monitored Natural Attenuation, Sampling of Private Wells in the Shad Bend Community, Institutional Controls, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5. Alternative RAA2 satisfies the statutory requirement of Section 121(b) of CERCLA, 42 USC Section 9621(b), which provides that the selected alternative be protective of human health and the environment, comply with ARARs, be cost effective, and utilize permanent solutions and treatments to the maximum extent practicable. A description of the selected remedial alternative can be found in Section 8.1.2. A list of all activities incorporated into the Flanders Filters' remedial action is specified below.

The selection of natural attenuation as the remedy for this Site is based on the following facts:

1. As stated in Section 9.1.1, based on available information, it is believed that the extent of the groundwater impact has been reached. The plume has migrated to the edge of Mitchell Branch, which is acting as a discharge boundary or hydraulic divide to the groundwater flowing from the Site to the east. Therefore, the groundwater plume will not migrate beyond Mitchell Branch.

2. The data in Table 7 clearly show that the levels of contaminants in the groundwater have dropped significantly since 1988.

3. Based on the Bioscreen model, using a first order of decay, it was estimated to take approximately 9 years for the levels of organic contaminants in the groundwater to decline to their clean-up levels. The time frame for the active remediation alternatives (i.e., pump and treat and air sparging/soil vapor extraction) was 8 years.

Groundwater and surface water quality will be monitored on a semi-annual basis. Initially, all samples collected will be analyzed for VOCs, SVOCs, and inorganics. Groundwater samples will be collected from on-site monitoring wells, off-site monitoring wells, and off-site private wells. As the data base increases, the frequency the samples are collected and the comprehensiveness of the chemical analyses conducted on each sample may be modified with the Agency's concurrence. In addition to analyzing the groundwater for VOCs, SVOCs, and inorganics, selected groundwater samples will also be monitored on a periodic basis for natural attenuation parameters. For guidance, the requirements set forth in the Draft EPA Region 4 Suggested Practices for Evaluation of a Site For Natural Attenuation (Biological Degradation) of

Chlorinated Solvents, November, 1997, Version 3.0, as amended, shall be followed.

To confirm the estimated time frame as to when the performance standards will be achieved across the entire Site, developed in the FS, a fate and transport model using Bioplume II, RT3D, or equivalent will be completed with two years of the issuance of this ROD. To assist with the modeling, an additional groundwater monitoring well will be installed downgradient of MW-14, approximately 400 feet to the southeast.

Water levels will be measured in all monitoring wells on a quarterly basis until any seasonal perturbations in the groundwater flow direction have been established.

The following institutional controls will be implemented: "land use restrictions" and "deed recordation". The land use restriction will contain language to accomplish the following three objectives:

1) restrict future land use which would decrease the likelihood of human exposure to contaminated soils;

2) prevent the installation of a potable well at the Site until the levels of contamination in the groundwater under the Site are deemed safe; and

3) prevent excavation in contaminated soils without sufficient personal protection for the workers.

The deed recordation will contain language that will inform any potential buyer of the property of the contamination present. The suitable land use restrictions and deed recordation shall be recorded in the appropriate state, county, and/or local office(s).

In an effort to prevent any migration of contaminants into the lower aquifer, the four inactive supply wells will be abandoned in accordance to North Carolina regulation NCAC, Title 15A, Subchapter 2C, Section .0100, Subsection .0113 - Abandonment of Wells.

To reduce future liability, all of the aboveground storage tanks in area AOC#5 will be removed. After their removal, the surrounding and underlying soils will be visually inspected and sampled.

Because this alternative leaves hazardous materials on Site, a review of the Site's remedy every five years is required. This review process will continue every five years until theperformance standard (cleanup goal) for the identified contaminants (Table 12) in the groundwater are achieved.

10.3 DESCRIPTION OF CONTINGENT REMEDIAL ACTION

Section 10.0 specifies under what condition the contingent remedial action will be implemented. Section 8.1.4 describes the components of the contingent remedial action.

10.4 COST

The total present worth costs for the selected alternative is

Capital Costs:	$88,000
Present Worth Operating & Maintenance Costs:	$298,000
TOTAL PRESENT WORTH COST:	$386,000

The total present worth costs for the contingent alternative is

Capital Costs:	$419,000
Present Worth Operating & Maintenance Costs:	$584,000
TOTAL PRESENT WORTH COST:	$1,003,000

11.0 STATUTORY DETERMINATION

Based on available information, the selected remedy satisfies the requirements of Section 121 of CERCLA, as amended by SARA, and the NCP. The remedy provides protection of human health and the environment, is cost-effective, utilizes permanent solutions to the maximum extent practicable, and satisfies the statutory preference for remedies involving treatment technologies.

11.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Through natural attenuation processes, the selected remedy will remediate the groundwater. Institutional controls will be implemented to protect against the use of contaminated groundwater as potable water until the adversely impacted groundwater is deemed safe.

11.2 COMPLIANCE WITH ARARS

The selected remedy will be designed to meet all Federal or more stringent State environmental laws. A complete list of the ARARs which are to be attained is included in Table 11. No waivers of Federal or State requirements are anticipated.

11.3 COST-EFFECTIVENESS

The selected remedial action is more cost-effective than the other acceptable alternatives considered. The selected remedy will provide greater benefit for the cost.

11.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

The selected remedy represents the maximum extent to which permanent solutions and treatment can be practicably utilized for this action. Of the alternatives that are protective of human health and the environment and comply with ARARs, EPA and the State have determined that the selected remedy provides the best balance of trade-offs in terms of: long-term effectiveness and permanence; reduction in mobility, toxicity, or volume achieved through treatment; short-term effectiveness, implementability, and cost; State and community acceptance; and the statutory preference for treatment as a principal element.

11.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected remedial alternative does not require the implementation of an active remediation system to treat the contaminants at the Site. However, based on Site specific data, it has been documented that the processes which comprise natural attenuation will result in treatment of the contaminants present at the Site leading to a reduction in their toxicity, mobility, or volume.

11.6 FIVE-YEAR REVIEW REQUIREMENTS

Because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

12.0 SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of any significant changes from the preferred alternative originally presented in the Proposed Plan (Appendix C). Below are the specific changes made in the ROD as well as the supporting rationale for making those changes. The Proposed Plan was disseminated to the public on June 19, 1998.

Two changes were made between the Proposed Plan and the ROD. The first change involves correcting the number of inactive supply wells that need to be abandoned. The Proposed Plan specified three (3), however, there are four (4) inactive supply wells that need to be abandoned.

The second change involves incorporating private wells located in the Shad Bend community in the long-term groundwater monitoring scheme to be implemented at the Site. Therefore, the long-term monitoring plan will include on-site monitoring wells, off-site monitoring wells, and off-site private wells.

APPENDIX A

CONCURRENCE LETTER FROM THE STATE OF NORTH CAROLINA
AND RESPONSE FROM THE AGENCY

<IMG SRC 98085F1>
<IMG SRC 98085G>

APPENDIX B

Flanders Filters March 1998 Letter

<IMG SRC 98085H>

APPENDIX C

PROPOSED PLAN FACT SHEET

<IMG SRC 98085I>

INTRODUCTION

The goals of this Proposed Plan are 1) to summarize the Remedial Investigation Report and Feasibility Study document, 2) to inform the public that the Agency is proposing to issue a Record of Decision (ROD) for this Site which includes a contingent alternative, 3) to highlight the Agency's preferred remedial alternative for the Flanders Filters Site, and 4) to identify the contingent remedial alternative. The Agency's preferred remedial alternative and the contingency remedial alternative are presented in the section entitled "EPA's PREFERRED ALTERNATIVE", on page 13.

The Environmental Protection Agency (EPA), lead Agency for Site activities, prepared this Proposed Plan with the assistance of the North Carolina Department of Environment and Natural Resources (NCDENR), the support agency. The source of data and information presented in this Proposed Plan Fact Sheet comes from the Remedial Investigation Report, dated July 28,1997, (which includes the December 15, 1997 revised Baseline Risk Assessment) and the revised Feasibility Study document, dated March 25, 1998. EPA, in consultation with NCDENR, will select a remedy only after the public comment period ends and all information submitted to EPA during this time has been reviewed and considered.

EPA is issuing this Proposed Plan as part of its public participation responsibilities in accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund. This Proposed Plan Fact Sheet summarizes information presented in the July 1997 Remedial Investigation Report, the March 1998 revised Feasibility Study document, and other pertinent documents contained in the Information Repository/Administrative Record for this Site. EPA and the State encourages the public to review these documents to better understand the Site and the Superfund activities conducted. The Administrative Record is available for public review locally at the Brown Public Library, 122 Van Norden Street, Washington, North Carolina.

EPA, in consultation With NCDENR, may modify the preferred alternative or select another response action presented in this Plan and the Remedial Investigation and the Feasibility Study Reports based on new information and/or public comments. Therefore, the public is encouraged to review and comment on all alternatives discussed below. This Proposed Plan:

1. Includes a brief background of the Site and the principal findings of the Remedial Investigation;
2. Presents the remedial (cleanup) alternatives considered by EPA;
3. Outlines the evaluation criteria used to recommend a remedial alternative;
4. Summarizes the analysis based on the evaluation criteria;
5. Presents EPA's rationale for its recommended remedial alternative; and
6. Explains the opportunities for the public to comment on the remedial alternatives and become involved in the process.

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SITE BACKGROUND

The Flanders Filters facility occupies approximately 65 acres on Flanders Filters Road four miles northwest of Washington, North Carolina (refer to Figure 1). Presently, land use immediately adjacent to the Site is a mixture of agricultural and residential. The Site is bordered to the north, northwest, and west by agricultural land and an abandoned railroad. A stream called, Mitchell Branch, and a wetlands area are adjacent to the east. Land to the south is occupied by the Shad Bend subdivision.

Mitchell Branch empties into Tranters Creek, which in turn empties into the Tar River near the upper extent of the Pamlico River. Mitchell Branch and Tranters Creek are bordered by extensive wetlands and reported to be recreational fisheries. Tranters Creek meanders and passes within about 2,000 feet of the Site to the west and to the south. No active surface water intakes are located within 15 miles downstream of the Site.

In 1969, Flanders Filters developed this property and has since used this facility for the manufacturing of high efficiency, borosilicate glass micro-filters and air filter framing systems. Currently, the facility includes the main plant building, four warehouses, a metal shop, a maintenance shop, a paint shop, a water treatment plant, a chemical storage shelter, a nitrification field (leach field) for the septic system, two former spray fields, and other support structures (refer to Figure 2). The property is partially fenced and has gates at the three entrances to the plant.

In April 1969, North Carolina Division of Environmental Management (NCDEM) issued to Flanders Filters a permit (#1590) to construct and operate a facility to handle 1,000 gallons of wastewater from the manufacturing process per day. The wastewater facility included two retention ponds which had a total storage capacity of 330,000 gallons. From 1969 to 1978, an estimated 500 to 700 gallons of untreated wastewater were transported daily to the Old Beaufort County landfill for disposal. No records or manifests were kept of these shipments.

In April 1977, NCDEM Issued Flanders Filters permit #4276 for a 4,500 gallons per day wastewater treatment system and the use of a 2.75-acre spray field (spray field #1) for the discharge of the treated wastewater. This spray field is now partially covered by the metal shop. A clay-lined by-pass pond was part of this treatment system. The use of this facility began in February 1978. No records are available pertaining to the estimated daily volume discharged to spray field #1. Permit #4276 was renewed in March 1982. As a condition of this renewal, Flanders Filters was required to install three monitoring wells and monitor the groundwater for aluminum and zinc.

In May 1984, Flander's Filters received authorization (permit # 4276-R) to open a 4.08-acre spray field (spray field #2) located southeast of the plant area. This permit required that additional monitoring wells be installed. The metal shop area was expanded in 1984 and spray field #1 was closed. Also in May 1984, Flanders Filters requested approval to use the existing wastewater treatment system for the disposal of treated wastewater from a newly installed metal cleaning system. This system was used for removing mild surface contaminants and weld oxidation from stainless steel and aluminum filter frames.

During 1986 and 1987, Flanders Filters maintained their permit and obtained approval to increase flow to spray field #2 from 4,500 gallons per day to 10,000 gallons per day. No records are available pertaining to the estimated daily volume discharged to spray field #2 during this time. In April 1988, Flanders Filters requested approval to increase the size of spray field #2. In response, the State expressed concern about elevated groundwater levels of nitrate, total dissolved solids, phenol, and aluminum. Consequentially, the State required the installation of three additional monitoring wells. In August 1988, permission was granted to expand the spray field to 8.24 acres with an increase in flow to 20,000 gallons per day.

In February 1989, the State allowed an increase in flow to 30,000 gallons per day (under permit # WQ0000628). As before, no discharge records are available for this time frame, but it has been reported that the estimated daily volume of treated wastewater discharged to this spray field was 2,000 gallons per hour for 8 hours per day, five days per week. Spray field #2 was operated for about 10 years and is no longer in operation.

During June and July 1993, EPA conducted an expanded site inspection at the Flanders Filters site. This study documented the presence of the following contaminants at the Site: chromium, copper, nickel, zinc, bis (2ethylhexyl) phthalate, pyrene, and arsenic. No contaminants of concern were identified in a sample collected from a nearby private well. Bis (2-ethylhexyl) phthalate and 1,1-dichloroethane were found above detectable levels in one public supply well. Flanders Filters, Inc. entered into an Administrative Order on Consent with the Agency in February 1996 to conduct a Remedial Investigation and Feasibility Study at the Site. Since the Site is not as complex as other Sites, all work was accomplished under one operable unit.

RESULTS OF THE REMEDIAL INVESTIGATION

In developing the June 1996 Remedial Investigation/Feasibility Study Work Plan, nine (9) areas of concern (AOC) (i.e., potential sources of contamination) were identified (refer to Figure 2). To investigate these potential areas of contamination and to determine the extent of any contamination at the Site, seventy (70) environmental samples were collected as part of the Remedial Investigation/ Feasibility Study effort. These environmental samples were collected from surface and subsurface soils, surface water and sediment from Mitchell Branch, sediment from Tranters Creek, and groundwater.

The Remedial Investigation identified the following contaminants of concern across the Site:

1,1-dichloroethane	1,1,1-trichloroethane
1,1-dichloroethene	tetrachloroethene
trichloroethene	chloroform
vinyl chloride	aluminum
antimony	chromium

Volatile organic compounds, semi-volatile organic compounds, and metals were detected in the Acid Vat/Hazardous Waste/Drum Storage Area (AOC #1). The presence of volatile and semi-volatile organic compounds in the surface and subsurface soils as well as the underlying groundwater are consistent with spills and leaks that have occurred in this area over the years. The probable cause of the elevated metal levels in this area was the accidental release of approximately 440 gallons of an acidic solution in 1992 from the acid pickling operation.

Analytical data for samples collected from the Retention Ponds (AOC, #2) and (the Spray Field #1/Metal Shop area (AOC #3) indicate that neither of these areas are sources of contamination. The source of the contaminants being detected in the groundwater downgradient of AOC #2 is AOC #1.

Numerous environmental samples were collected from (Spray Field #2 (AOC #4). Only trace levels of volatile and semi-volatile organic compounds were detected in the soils in this area, therefore neither volatile nor semi-volatile organic compounds are a concern in the soils in this particular area. Several inorganics were detected at concentrations twice their background level. Of these, only zinc can be traced back to past Site operations. As with the groundwater beneath AOC #2, based on groundwater flow directions, it is surmised that the volatile organic compounds being detected in the groundwater beneath AOC #4 have migrated from AOC #1.

Xylenes, numerous semi-volatile polycyclic aromatic hydrocarbons, #2 fuel oil, varsol, antimony, arsenic, copper, and zinc were detected in the soils associated with the (Aboveground Storage Tanks and By-pass Pond (AOC #5). Any adverse impact to the underlying groundwater in this area has been minimized due to the by-pass pond being clay-lined as clay impedes the migration of most contaminants.

The abandoned railroad track (AOC #6) was not sampled as no creosote related contaminants were detected in the adjacent drainage ditch. The drainage ditches, collectively, were designated as AOC #7. Volatile and semi-volatile organic compounds as well as numerous metals were detected in the drainage ditches. This impact to surface water and sediment is the result of surface water runoff from the plant and parking lot and groundwater recharge to the these ditches.

Based on surface water and sediment samples collected from Mitchell Branch (AOC #8), it has been documented that Site related volatile organic compounds are being released into this stream. These contaminants are reaching Mitchell Branch either through the discharge of groundwater into Mitchell Branch or from surface water flowing through drainage ditches and discharging into Mitchell Branch, or from a combination of the two. No metals were detected from sediment samples collected from Tranters Creek.

The groundwater underlying the Site and migrating predominantly towards Mitchell Branch is defined as AOC #9. Numerous contaminants have been detected in the groundwater at the Site. The list presented at the beginning of this section inventories the significant contaminants detected in the groundwater. Figure 3 shows the extent of the migration of the contaminant 1,1-dichloroethene at the Site. The curved line that mimics the tree line in the southern portion of the Site that runs from monitoring well #4 (MW-4) easterly to monitoring well #10 (MW-10) identifies the extent of 1,1-dichloroethene migration at the Site. Other Site related contaminants in the groundwater either mimic this depiction of migration or has not migrated as far as 1,1-dichloroethene.

The highest levels of contaminants in the groundwater as were found downgradient of the hazardous waste storage area and the manufacturing area with trace levels extending across portions of the Site. Trace levels of volatile organic compounds and elevated levels of metals have been documented in the former Shad Bend supply wells. These wells were taken out of service in 1995.

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Two shallow monitoring wells were installed on the other side of Mitchell Branch as part of the Remedial Investigation. The rationale for the installation of these wells was 1) to determine if Mitchell Branch is a hydrogeologic divide for groundwater and 2) to insure residents with private potable wells an the other side of Mitchell Branch (i.e., off-site) that the source of their drinking water (i.e., the groundwater) has not been adversely impacted by Site activities. These wells will now act as sentinel wells and will be sampled periodically to insure the public that their drinking water has not been adversely impacted by Site activities. Neither well contained volatile nor semi-volatile organic compounds above trace levels. Concentrations of metals were also below levels of concern. The only organic contaminant detected in either off-site monitoring well was toluene and it was detected at a trace level. This data along with groundwater level measurements, verify that Mitchell Branch is a hydrogeologic divide and that any contaminants that do migrate off-site via groundwater will discharge into Mitchell Branch and will not travel east of Mitchell Branch via groundwater.

SUMMARY OF SITE RISKS

A goal of the Remedial Investigation/Feasibility Study process is to analyze and estimate the human health and environmental problems that could result at a Site if the contamination is not cleaned up. This analysis is called a Baseline Risk Assessment. In calculating risks to a population if no remedial action is taken, EPA evaluates reasonable maximum exposure levels undercurrent and potential future exposure scenarios to Site contaminants. In order to calculate a risk, an uninterrupted exposure pathway must be present. An exposure pathway is the route or mechanism by which a chemical agent travels from a source to an individual or population. In order for an exposure pathway to be considered complete, all of the following factors must be present:

- A source of chemical and mechanism for its release to the environment;
- A transport medium (e.g., soil, groundwater, air, etc.);
- An exposure point (where a receptor will contact the medium); and
- An exposure route (i.e., ingestion, inhalation, or dermal contact).

The risk scenarios evaluated in the Flanders Filters' Baseline Risk Assessment under current conditions included ingestion, dermal contact, and inhalation of contaminated groundwater, ingestion and dermal contact to contaminated surface water and stream sediment; and ingestion and dermal contact to contaminated surface and subsurface soils. For groundwater, the risk assessment considered only a residential scenario as the Flanders Filters facility receives its potable water from the City of Washington. For surface water, sediment, and soil exposure scenarios, the risk assessment evaluated risks for on-site workers and trespassers. The future risk scenarios developed in the Baseline Risk Assessment were for residential conditions and the same environmental pathways were examined as listed above.

The residential use of groundwater considered residents using the contaminated groundwater as their source of potable water (i.e., water used for drinking, cooking, bathing, etc.). In conducting this assessment, EPA focuses on the adverse human health effects that could result from long-term daily, direct exposure as a result of ingestion, inhalation, or dermal contact to carcinogenic chemicals (cancer causing) as well as the adverse health effects that could result from long-term exposure to non-carcinogenic chemicals present at the Site.

EPA's goal at Superfund sites is to 1) reduce the excess lifetime cancer risk and 2) reduce the excess lifetime non-carcinogenic health effects due to being exposed to chemicals present at the Site. For carcinogens, the Agency has established that the risk of developing cancer due to this exposure of chemicals at the Site should not exceed one in ten thousand. For non-carcinogens, which is represented by the term, Hazardous Quotient, the additional risk due to the Site related chemicals should not exceed a value of one (1). Typically, if either situation exists at a Site, the Agency is encouraged to select a remedy other than "No Action".

Table 1 summarizes the accumulative effect of all potential exposure pathways/risk scenarios identified at the Flanders Filters. Under current conditions, the only unacceptable risk is associated with current residents. However, this unacceptable risk is in conjunction with using contaminated groundwater for potable purposes and since no residents are using contaminated groundwater as their potable water source, this concern can be disregarded.

The Baseline Risk Assessment takes a very conservative approach in calculating risk. Although the carcinogenic risk for on-site workers is within the acceptable risk range, it is the Agency's judgment that an on-site worker would not be exposed to all the potential exposure pathways while working at the Flanders Filters facility, and therefore, the Site poses even a smaller risk to on-site workers than calculated.

Three future risk scenarios were identified which could result in an unacceptable risk to people if these scenarios became reality. These future risk scenarios entail residents living in homes built on the Site. The first two scenarios involve residential adults and residential children using the contaminated groundwater beneath the Site as their source for potable water. The third scenario that could result in another unacceptable future risk involves a child, living on-site, ingesting surface soils. Currently, the potential for is exposure is non-existent for either, as no adults or children live on the Site nor is this a possibility in the future.

It is the Agency's position that due to the current situation at the Flanders Filters facility that the future risk scenarios evaluated in the Baseline Risk Assessment will not come to fruition (i.e., future on-site residents). This position is based on a March 18, 1998 correspondence from Flanders Filters, Inc. stating that their plan is to remain at this location and keep manufacturing filters at this "site for the long term foreseeable future". This statement is bolstered by the fact that Flanders Filters, Inc. is currently investing over $1,000,000 in capital improvements at the facility. However, if the use of this property is changed prior to the performance standards (clean-up goals) being achieved, the Agency will re-evaluate this position.

The following factors were considered as part of this Ecological Risk Assessment:

- assess the components of biological communities on-site and in the vicinity, including vegetation, mammals, birds, reptiles, amphibians, and the aquatic biota;
- determine the location, extent, and characteristics of ecological resources on-site and in the vicinity that could serve as wildlife habitat or provide other ecological functions; and
- identify overt effects of contamination on biological communities.

Based on observations made during the ecological risk assessment Site visit, no endangered or threatened species were identified and no evidence of any visible stress to habitat or animal life was observed.

The ecological assessment identified the following contaminants as potential environmental stressors:

acetone	benzene
bis (2-ethylhexyl) phthalate	aluminum
arsenic	chromium
copper	iron
lead	zinc

These environmental stressors are present in on-site surface and subsurface soils, groundwater, and surface water and sediments; surface water and sediments found in Mitchell Branch; and in the wetlands located between the Site and Mitchell Branch. Of the constituents listed above, aluminum and zinc were identified as potential metals that could bioaccumulate in the aquatic ecosystem.

Due to the low levels of contaminants detected in the environment, only small to slight potential exists that these contaminants would cause an adverse affect to the ecology. Therefore, because of the high ecological value of the habitat around the Site, it is the Agency's opinion that enacting a remediation in or around Mitchell Branch would pose a greater risk to the health of this habitat than the presence of the current levels and types of contaminants.

TABLE 1 - SUMMARY OF HEALTH EFFECTS

	ON-SITE WORKER	SITE TRESPASSER	CHILD RESIDENT (CURRENT)	ADULT RESIDENT (CURRENT)	CHILD RESIDENT (FUTURE)	ADULT RESIDENT (FUTURE)
CARCINOGENIC RISK	Within Acceptable Risk Range	No Unacceptable Risk	Just Within Acceptable Risk Range	Just Within Acceptable Risk Range	Just Within Acceptable Risk Rang	Just Within Acceptable Risk Range
NON CARCINOGENIC RISK	No Unacceptable Risk	No Unacceptable Risk	Unacceptable Risk	Unacceptable Risk	Unacceptable Risk	Unacceptable Risk

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives are cleanup goals established to protect human health and the environment from each environmental media of concern by preventing exposures to concentrations of contaminants above risk-based human health or environmental standards. Protecting human health may be achieved by either reducing exposure or reducing contaminant levels. Protection of the environment includes protection of natural resources for future uses.

In identifying the Remedial Action Objectives, the findings of the Baseline Risk Assessment were used as well as an examination of all potential Federal and State environmental Applicable or Relevant and Appropriate Requirements (ARARs). ARARs can be categorized as chemical-specific, location-specific, or action-specific. Chemical-specific ARARs are acceptable exposure levels to particular chemicals and is the limit that must be met for that contaminant within an environmental medium (i.e., water, soil, or air) at a specific compliance point. Table 2 lists the chemical specific ARARs that pertain to this Site. Location specific ARARs address site-specific aspects such as a critical habitat upon which endangered species or threatened species depend, the presence of a wetland, or a historically significant feature. Action-specific requirements are controls or restrictions for particular activities related to the implementation of the proposed remedial alternative.

In summary, the Remedial Action Objectives for the Flanders Filters site are:

#1: Remediate groundwater to the specified remediation levels and

#2: Limit the exposure of receptors to impacted groundwater.

SUMMARY OF REMEDIAL ALTERNATIVES

The following section summarizes - the cleanup technologies and alternatives developed in the Flanders Filters Feasibility Study document for addressing the contamination at the Site. Descriptions of the clean-up alternatives are summarized below.

The cost information below represents the estimated total present worth of each alternative. Total present worth was calculated by combining the capital cost plus the present worth of the annual operating and maintenance costs. Capital cost includes construction, engineering and design, equipment, and site development. Operating costs were calculated for activities that continue after completion of construction, such as routine operation and maintenance of treatment equipment and monitoring. The present worth of an alternative is the amount of capital required to be deposited at the present time at a given interest rate (7%) to yield the total amount necessary to pay for initial construction costs and future expenditures, including
operation and maintenance and future replacement of capital equipment.

For more information about the Remedial Action Objectives and alternatives, please refer to the March 25, 1998 Feasibility Study document and other documents available in the information repository in the Brown Public Library.

REMEDIAL ALTERNATIVES

Four remedial alternatives were evaluated in detail in the Feasibility Study for the Flanders Filters site. In addition to the information presented in the Feasibility Study, Flanders Filters also developed cost estimates for two additional remediation technologies in a letter dated May 11, 1998 which will be incorporated into this section. The four primary remedial alternatives include:

Alternative RAA1: No Action

Alternative RAA2: Monitored Natural Attenuation, Institutional Controls, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5

Alternative RAA3: Limited Groundwater Extraction with Discharge to Mitchell Creek via a NPDES Permit, Monitoring, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #6

Alternative RAA4: Air Sparging with Soil Vapor Extraction, Monitoring, & Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks In AOC #5

ALTERNATIVE RAA1: NO ACTION

Capital Costs:	$ 8,000
Present Worth Operating & Maintenance Costs:	$256,000
Total Present Worth Costs:	$264,000
Time to Design:	None
Construction Time:	None
Duration to Achieve Clean-up:	9 years

TABLE 2 - CHEMICAL-SPECIFIC ARARs

Chemical of Concern	Highest Concentration Detected On-site	# of Detections	Federal MCL	Secondary Federal MCL	North Carolina Groundwater 2L Standards
Chloroform (Trihalomethanes)	0.2	7/36	100		0.19
1,1-Dichloroethene	73	22/36	7		7
Tetrachloroethene	5	14/36			0.7
1,1,1-Trichloroethane	600	20/36	200		200
Trichloroethene	14	15/36	5		2.8
Vinyl Chloride	5	3/36	2		0.015
Aluminum	12,100	20/36	NS	50-200	NS
Antimony	21.1	1/36	6		NS
Arsenic	6.5	3/36	50		50
Iron	9,840	28/36		300	300
Manganese	207	26/36		50	50

All concentrations reported in micrograms/liter Ig/l or parts per billion (ppb)

CERCLA requires that the "No Action" alternative be evaluated at every Superfund Site to establish a baseline for comparison. No remediation activities would occur at the Site under this alternative (i.e., the Site is left "as is"). Because this alternative neither removes nor destroys the contamination (i.e., contamination is left on-site), a review of the remedy will need to be conducted every five years (i.e., Five-Year Review Report) in accordance with CERCLA Section 121(c). This review process will continue every five years until the cleanup goals for the identified contaminants are achieved across the entire Site.

If no action is taken migration of contaminants will continue. This migration results from the natural movement of precipitation (e.g., rain and melted snow) moving through the soils and carrying the contamination downward as the precipitation recharges the aquifer. Although Alternative RAA1 does not actively reduce or eliminate Site contamination, it is anticipated that the levels of contaminants will decrease over time due to the process of natural attenuation. Natural attenuation is defined in Alternative RAA2 description.

There is a minimal capital cost associated with Alternative RAA1. The capital cost is for the development of a work plan for preparing Five-Year Review Reports and the monitoring activities necessary for the preparation of these reports. Operating & Maintenance Costs are associated with periodic monitoring of the Site in order to prepare the Five-Year Review Reports. As part of the five year review, groundwater and surface water samples will be collected for chemical analyses on a semi-annual basis. Based on some simple modeling, using a first order of decay, it has been estimated that it will take approximately 9 years for the levels of organic contaminants to drop to their clean up goals.

ALTERNATIVE RAA2: MONITORED NATURAL ATTENTUATION, INSTITUTIONAL CONTROLS, ABANDONMENT OF PUBLIC SUPPLY WELLS,& REMOVAL OF ABOVEGROUND STORAGE TANKS IN AOC #5

Capital Costs:	$ 88,000
Present Worth Operating & Maintenance Costs:	$298,000
Total Present Worth Costs:	$386,000
Time to Design:	3 months
Construction Time:	N/A
Duration to Achieve Clean-up:	9 years

"Monitored natural attenuation" relies on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remedial objectives within a time frame that is reasonable compared to that offered by other more active methods. The "natural attenuation processes" that are at work in a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; and chemical or biological stabilization, transformation, or destruction of contaminants.

Groundwater and surface water quality will be monitored on a semiannual basis. In addition to analyzing the groundwater for volatile, semi-volatile, and inorganic contaminants (as needed), groundwater will also be monitored on a periodic basis for natural attenuation parameters. The data generated from these monitoring efforts will be used to 1) insure that the contaminants are not migrating further than predicted and 2) develop and maintain a data base that confirms and verifies that natural attenuation is occurring.

Institutional controls include "land use restrictions" and "deed recordation" under North Carolina regulations. The ability to implement these two institutional controls is codified under 15A NCAC 13C 130A-310.3(f) and 15A NCAC 13C 130A-310.8, respectively. The land use restriction will contain language to accomplish the following three objectives: 1) restrict future land use which would decrease the likelihood of human exposure to contaminated soils, 2) prevent the installation of a potable well at the Site until the levels of contamination in the groundwater under the Site are deemed safe, and 3) prevent excavation in contaminated soils without sufficient personal protection for the workers. The deed recordation will contain language that will inform any potential buyer of the property of the contamination present. The suitable land use restrictions and deed recordation shall be recorded in the appropriate state and/or county office.

In an effort to prevent any migration of contaminants into the lower aquifer, Flanders Filters will abandon the three inactive supply wells. These wells will be abandoned in accordance to North Carolina regulation NCAC, Title 15A, Department of Environment, Health & Natural Resources, Division of Environmental Management, Subchapter 2C, Section .0100, Subsection .0113 - Abandonment of Wells.

Although the contamination detected in AOC #5 does not warrant cleanup under CERCLA, Flanders Filters, as part of house keeping efforts, will remove the above ground storage tanks from this area. After their removal, the surrounding and underlying soils will be visually inspected and sampled.

As with Alternative RAA1, Five-Year Review Reports would be prepared until all perforrnance standards are obtained across the entire Site.

ALTERNATIVE RAA3: LIMITED GROUNDWATER EXTRACTION WITH DISCHARGE TO MITCHELL CREEK VIA AN NPDES PERMIT, MONITORING, ABANDONMENT OF INACTIVE PUBLIC SUPPLY WELLS, & REMOVAL OF ABOVEGROUND STORAGE TANKS IN AOC #5

Capital Costs:	$ 441,000
Present Worth Operating & Maintenance Costs:	$ 763,000
Total Present Worth Costs:	$1,204,000
Time to Design:	10 months
Construction Time:	8 months
Duration to Achieve Clean-up:	8 years

This alternative employs extraction wells in two areas of the Site to remove the contaminated groundwater from the aquifer. It was estimated that two extraction wells would be installed in the vicinity of AOC #1 and a row of six extraction wells would be installed between the Former Ponds 1&2 and the leach field (refer to Figure 2). Extracted groundwater would be piped to an on-site air stripping unit and discharged to Mitchell Branch in accordance with an National Pollutant Discharge Elimination System (NPDES) permit. Additional treatment of extracted groundwater, such as pH adjustment and metals removal, may be necessary in order to the achieve discharge limits established in the NPDES permit. Due to the low levels of emissions expected from the air stripping unit, the vapors would be discharged to the atmosphere and no air discharge permit is expected to be required. These details would be confirmed during the Remedial Design phase.

As part of this alternative, Flanders Filters will be required to enact the institutional controls, the abandonment of the inactive public supply wells, and prepare the Five-Year Review reports as discussed under Alternative RAA2. The Feasibility Study estimated that it would take 8 years for this alternative to achieve the performance standards.

ALTERNATIVE RAA4: AIR SPARGING WITH SOIL VAPOR EXTRACTION, MONITORING, & ABANDONMENT OF INACTIVE PUBLIC SUPPLY WELLS, & REMOVAL OF ABOVEGROUND STORAGE TANKS IN AOC #5

Capital Costs:	$ 419,000
Present Worth Operating & Maintenance Costs:	$ 584,000
Total Present Worth Costs:	$1,003,000
Time to Design:	10 months
Construction Time:	8 month
Duration to Achieve Clean-up:	8 years

This alternative is a combination of natural attenuation with an air sparging/soil vapor extraction system. The air sparging/soil vapor extraction system would be installed in the same two areas identified in Alternative RAA3. Air sparging technology injects air into the saturated zone through air sparging point wells in order to transfer the volatile organic compounds from the liquid phase the gaseous phase. The vapors are then removed by the pull of a vacuum created In the vadose zone soils through the soil vapor extraction points. Due to the low levels of emissions expected, the vapors would be discharged to the atmosphere and no air discharge permit is expected to be required. These details would be confirmed during the Remedial Design phase.

As part of this alternative, Flanders Filters will be required to enact the institutional controls, the abandonment of the inactive public supply wells, and prepare the Five-Year Review reports as discussed under Alternative RAA2. The Feasibility Study estimated that it would take 8 years for this alternative to achieve the performance standards.

CRITERIA FOR EVALUATING REMEDIAL ALTERNATIVES

The selection of the preferred alternative for the Flanders Filters site, as described in this Proposed Plan, is the result of a comprehensive screening and evaluation process. The Feasibility Study identified and analyzed appropriate alternatives for addressing the contamination at the Site. The Feasibility Study and other documents describe in detail, the alternatives considered, as well as the process and criteria EPA used to narrow the list of the potential remedial alternatives toaddress the contamination at the Site. As stated previously, all of these documents are available for public review in the Information Repository/Administrative Record.

EPA always uses the following nine criteria to evaluate alternatives identified in the Feasibility Study. The remedial alternative selected for a Superfund site must achieve the two threshold criteria as well as attain the best balance among the five evaluation criteria. EPA's Proposed Alternative may be altered or changed based an the two modifying criteria. The nine criteria are as follows:

THRESHOLD CRITERIA

1. Overall protection of human health and the environment: The degree to which each alternative eliminates, reduces, or controls threats to public health and the environment through treatment, engineering methods or institutional controls.

2. Compliance With Applicable or Relevant and Appropriate Requirements (ARARs): The alternatives are evaluated for compliance with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the site conditions.

EVALUATING CRITERIA

3. Cost: The benefits of implementing a particular remedial alternative are weighed against the cost of implementation. Costs include the capital (up-front) cost of term, and the net present worth of both capital and operation and maintenance costs.

4. Implementability EPA considers the technical feasibility (e.g., how difficult the alternative is to construct and operate) and administrative ease (e.g., the amount of coordination with other government agencies that is needed) of a remedy, including the availability of necessary materials and services.

5. Short-term effectiveness: The length of time needed to implement each alternative is considered, and EPA assesses the risks that may be posed to workers and nearby residents during construction and implementation.

6. Lonq-term effectiveness: The alternatives are evaluated based on their ability to maintain reliable protection of public health and the environment over time once the cleanup goals have been met.

7. Reduction of contaminant toxicity, mobility, and volume: EPA evaluates each alternative based on how it reduces (1) the harmful nature of the contaminants, (2) their ability to move through the environment, and (3) the volume or amount of contamination at the site.

MODIFYING CRITERIA

8. State acceptance EPA requests state comments on the Remedial Investigation and Feasibility Study reports, as well as the Proposed Plan, and must take into consideration whether the state concurs with, opposes, or has no comment on EPA's preferred alternative.

9. Community acceptance: To ensure that the public has an adequate opportunity to provide input, EPA holds a public comment period and considers and responds to all comments received from the community prior to the final selection of a remedial action.

EVALUATION OF ALTERNATIVES

The following summary profiles the comparative analysis of the four alternatives in terms of the nine evaluation criteria:

Overall Protection: Alternatives RAA1 and RAA2 rely on attenuation processes exclusively. Alternatives RAA3 and RAA4 utilize established groundwater remediation technologies, groundwater extraction and air sparging/soil vapor extraction, respectively, to augment the passive attenuation process.

The extent of the groundwater impact is believed to have been reached at the Site. The plume has migrated to the edge of Mitchell Branch, which is acting as a discharge boundary or hydraulic divide to the groundwater flowing from the Site to the east. Therefore, the groundwater plume will not migrate beyond Mitchell Branch. When comparing the estimated time frames to achieve performance standards (cleanup goals), all four alternatives, are expected to provide long-term protection for human health and the environment. To insure that each alternative is protective, each alternative includes a monitoring program.

Under Alternatives RAA1, RAA2, and to some degree RAA3 contaminant levels are anticipated to decrease as a result of natural attenuation. Alternatives RAA3 and RAA4 may be considered more protective of the environment by removing contaminants from the soil/groundwater, thereby reducing the potential for migration of contaminants to groundwater and eventually off-site. However, because of Site conditions and technology limitations, RAA3 and RAA4 are only projected to remediate the Site in a slightly shorter time frame than RAA1 or RAA2. Therefore, RAA3 and RAA4 do not provide significant additional protection to human health and the environment than RAA1 or RAA2.

RAA2, RAA3, and RAA4 include deed restriction and recordation. These institutional controls are designed to restrict the aquifer to non-potable use and record areas of the aquifer above groundwater standards until such time as groundwater standards are achieved. These three alternatives also include abandonment of the inactive public supply wells which will keep additional contamination from migrating into the lower aquifer.

Compliance with ARARs: All four RAAs are expected to comply with State and Federal chemical-, location-, and action-specific ARARs that are established for this Site.

Long-term Effectiveness and Permanence: All of theRAAs are designed to accomplish long-term effectiveness and permanence. All of the alternatives rely on monitored natural attenuation, however, RAA3 and RAA4 augment attenuation with active cleanup systems. As identified in the remedial alternative description section, it is anticipated that each alternative will achieve the performance standards in nearly the same time frame.

Reduction of Toxicity, Mobility or Volume: Alternatives RAA3 and RAA4 actively reduce the toxicity, mass, and volume of contaminants in the groundwater and satisfy the statutory preference for treatment. However, natural attenuation processes will also reduce the toxicity, mobility, or volume of plume through natural processes. In addition, no treatment residuals are generated by Alternatives RAA1 or RAA2, as there could be with Alternatives RAA3 and RAA4.-

Short-term Effectiveness: Alternatives RAA1 and RAA2 pose fewer short-term risks to Site workers and the community than either Alternative RAA4 or RAA4. Alternative RAA3 and RAA4 may create more short-term risk due to the invasive nature of the system installation. Alternatives RAA3 and RAA4 also pose risks to receptors due to the long-term operation and maintenance of the active systems.

Implementability: Alternative RAA1 requires no implementation. Alternative RAA2 will be easy to implement because little to no construction is required. Both Alternatives RAA3 and RAA4 are projected to require approximately 12 months to design and construct, and approximately 8 years of operation. Both RAA3 and RAA4 will require the acquisition of a NPDES permit.

Cost: Total present worth costs for the alternatives are presented below:

Alternative RAA1 - No Action: $ 264,000

Alternative RAA2 - Monitored Natural Attenuation, Institutional Controls, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $ 386,000

Alternative RAA3 - Limited Groundwater Extraction with Discharge to Mitchell Creek via a NPDES; Permit, Monitoring, Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $1,204,000

Alternative RAA4 - Air Sparging with Soil Vapor Extraction, Monitoring, & Abandonment of Inactive Public Supply Wells, & Removal of Aboveground Storage Tanks in AOC #5: $1,003,000

EPA'S PREFERRED ALTERNATIVE

As stated in the Introduction, the Agency is proposing to issue a contingency Record of Decision for the Flanders Filters site. Alternative RAA2 is the Agency's preferred alternative and Alternative RAA4 is the contingency alternative.

ALTERNATIVE RAA2: MONITORED NATURAL ATTENUATION, INSTITUTIONAL CONTROLS, ABANDONMENT OF INACTIVE PUBLIC SUPPLY WELLS,& REMOVAL OF ABOVEGROUND STORAGE TANKS IN AOC #5

Based on current information, this alternative appears to provide the best balance of trade-offs with respect to the seven criteria that EPA used to evaluate these alternatives. EPA believes the preferred afternative will satisfy the statutory requirement of Section 121(b) of CERCLA, 42 USC 9621(b), which provides that the selected alternative be protective of human health and the environment, comply with ARARs, be cost effective, and utilize permanent solutions and treatments to the maximum extent practicable. The selection of Alternative RAA2 is preliminary and could change in response to public comments.

As this alternative relies on monitored natural attenuation to clean the soils and groundwater, Flanders Filters will be required to substantiate that natural degradation is occurring and continue to verify that natural attenuation continues to occur. The frequency of this monitoring will be established in the Remedial Design.

In the event the data collected cannot substantiate the occurrence of natural attenuation, beyond doubt, a contingency remedy, Alternative RAA4, will be implemented. It is anticipated that this decision will be made within three years of the signing of the Record of Decision.

Institutional controls to be implemented are "land use restrictions" and "deed recordation". Flanders Filters will record, in the appropriate county and/or State registrar's office, a deed restriction in which Flanders Filters, and any subsequent owner of the Site, would be prohibited from utilizing the groundwater for drinking water purposes until such time as the contaminated plume meets drinking water standards. Flanders Filters will also develop a plan that will protect any worker that needs to work below ground surface on-site.

In addition to the work specified above, Flanders Filters shall also implement the following action items:

1) Abandon the three inactive supply wells in an effort to inhibit the migration of contaminants into thelower aquifer,

2) Conduct house keeping activities in AOC #5 - these activities shall include the removal the aboveground storage tanks and the visual inspection and sampling of the underlying soil; and

3) As hazardous waste will remain on the Site, Flanders Filters is required to prepare and submit every five years the "Five-Year Review Report". These reports will be required until all performance standards are obtained across the entire Site.

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COMMUNITY PARTICIPATION

EPA has developed a community relations program as mandated by Congress under Superfund to respond to citizen's concerns and needs for information, and to enable residents and public officials to participate in the decision-making process. Public involvement activities undertaken at Superfund sites consist of interviews with local residents and elected officials, a community relations plan for each site, fact sheets, availability sessions, public meetings, public comment periods, newspaper advertisements, site visits, and any other actions needed to keep the community informed and involved.

EPA is conducting a 30-day public comment period from June 23, 1998 to July 23, 1998, to provide an opportunity for public involvement in selecting the final cleanup method for this Site. Public input on all alternatives, and on the information that supports the alternatives is an important contribution to the remedy selection process. During this comment period, the public is invited to attend a public meeting on June 23, 1998, in the Washington City Council Chambers, Washington, North Carolina beginning at 7:00 p.m. at which EPA will present the Remedial Investigation/Feasibility Study and Proposed Plan describing the preferred remedial alternative for the Flanders Filters site and to answer any questions. Because this Proposed Plan Fact Sheet provides only a summary description of the cleanup alternatives being considered, the public is encouraged to consult the Information Repository for a more detailed explanation.

During this 30-day comment period, the public is invited to review all site-related documents housed at the Information Repository located at the Brown Public Library, 122 Van Norden Street, Washington, North Carolina and offer comments to EPA either orally at the public meeting or in written form during this time period. The actual remedial action could be different from the preferred alternative, depending upon new information or statements EPA may receive as a result of public comments. If you prefer to submit written comments, please mail them postmarked no later than midnight July 23, 1998 to:

Diane Barrett
NC Community Involvement Coordinator
U.S.E.P.A., Region 4
North Site Management Branch
61 Forsyth Street SW
Atlanta, GA 30303-3014

All comments will be reviewed and a response prepared in making the final determination of the most appropriate alternative for cleanup/treatment of the Site. EPA's final choice of a remedy will be issued in a Record of Decision (ROD). A document called a Responsiveness Summary summarizing EPA's response to all public comments will also be issued with the ROD. Once the ROD is signed by the Regional Administrator it will become part of the Administrative Record (located at the Library) which contains all documents used by EPA in making a final determination of the best cleanup/treatment for the Site. Once the ROD has been approved, EPA will begin negotiations with the Potentially Responsible Party to allow them the opportunity to design, implement and absorb all costs of the remedy determined in the ROD in accordance with EPA guidance and protocol. Or EPA may issue a unilateral administrative order or directly file suit to force Flanders Filters to conduct the remedial activity. Once an agreement has been reached, the design of the selected remedy will be developed and implementation of the remedy can begin. The preceding actions are the standard procedures utilized during the Superfund process.

A Community Advisory Group (CAG) is made up of volunteer members of the community and is designed to serve as the focal point for the exchange of information among the local community and EPA, State regulatory agency, and other pertinent Federal agencies involved in cleanup of the Superfund site.

<IMG SRC 98085N>

GLOSSARY OF TERMS USED IN THIS FACT SHEET

Aquifer: An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Administrative Order on Consent: A legal document signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Administrative Record: A file which is maintained and contains all information used by the lead agency to make its decision on the selection of a method to be utilized to clean up/treat contamination at a Superfund site. This file is held in the information repository for public review.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and state requirements that a selected remedy must attain. These requirements may vary among sites and various alternatives.

Baseline Risk Assessment: A means of estimating the amount of damage a Superfund site could cause to human heath and the environment. Objectives of a risk assessment are to: help determine the need for action; help determine the levels of chemicals that can remain on the site after cleanup and still protect health and the environment; and provide a basis for comparing different cleanup methods.

Carcinogen: Any substance that can cause or contribute to the production of cancer, cancer-producing.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The Acts created a special tax paid by producers of various chemicals and oil products that goes into a Trust Fund, commonly known as Superfund. These Acts give EPA the authority to investigate and cleanup abandoned or uncontrolled hazardous waste sites utilizing money from the Superfund Trust or by taking legal action to force parties responsible for the contamination to pay for and clean up the site.

Feasibility Study: Refer to Remedial Investigation/Feasibility Study.

Groundwater: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel (usually in aquifers) which is often used for supplying wells and springs. Because groundwater is a major source of drinking water there is growing concern over areas where agricultural and industrial pollutants or substances are getting into groundwater.

Hazard Quotient: The numerical representation of the potential of noncarcinogenic health effects due to the exposure to a chemical.

Hazardous Ranking System (HRS): The principle screening tool used by EPA to evaluate risks to public health and the environment associated with hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or groundwater and on other factors such as nearby population. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hydraulic Divide: A geologic formation (ocean, lake, river, stream, mountain range, etc.) That groundwater does not flow underneath.

Information Repository: A file containing accurate up-to-date information, technical reports, reference documents, information about the Technical Assistance Grant, and any other materials pertinent to the site. This file is usually located in a public building such as a library, city hall or school, that is accessible for local residents.

National Pollutant Discharge Elimination System (NPDES): A provision of the Clean Water Act which prohibits the discharge of pollutants into waters of the linked States unless a special permit is issued by EPA, a state or (where delegated) a tribal government on an Indian reservation allowing a controlled discharge of liquid after it has undergone treatment.

Metals (Inorganics): Chemical substances of mineral origin, not of basically carbon structure.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. A site must be on the NPL to receive money from the Trust Fund for remedial action. The list is based primarily on the score a site receives from the Hazard Ranking System (HRS). EPA is required to update the NPL at least once a year.

Operable Unit: Term for each of a number of separate activities undertaken as part of an overall Superfund site cleanup.

Polycyclic Aromatic Hydrocarbon: Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot. Some PAHs are manufactured. PAHs are found in coal tar, crude oil, creosote, and roofing tar. A few are used in medicines, dyes, plastics and pesticides.

Potentially Responsible Parties (PRP): Any individual or company - including owners, operators, transporters, or generators - potentially responsible for, or contributing to, the contamination problems at a Superfund site. Whenever possible, EPA requires Potentially Responsible Parties, through administrative and legal actions, to clean up hazardous waste sites Potentially Responsible Parties have contaminated.

Remedial Action Objectives: These are specific objectives which are identified to protect both human health and the environment that take into consideration the environmental media contaminated (i.e., groundwater, soil, surface water, sediment, or air) and the contaminants present in each medium. The main goal of the objectives is to prevent exposure to contaminants in groundwater, soil, surface water, sediment, or air in excess of risk-based human health or environmental standards.

Remedial Investigation/Feasibility Study (RI/FS): The Remedial Investigation is an in-depth, extensive sampling and analytical study to gather data necessary to determine the nature and extent of contamination at a Superfund site; to establish criteria for cleaning up the she; a description and analysis of the potential cleanup alternatives for remedial actions; and support the technical and cost analyses of the alternatives. The Feasibility study also usually recommends selection of a cost-effective alternative.

Record of Decision (ROD): A public document that announces and explains which method has been selected by the Agency to be used at a Superfund site to clean up the contamination.

Responsiveness Summary: A summary of oral and written public comments received by EPA during a public comment period and EPA's responses to those comments. The responsiveness summary is a key part of the Record of Decision.

Semi-Volatile Organic Compounds (SVOCs): Carbon-containing chemical compounds that, at a relatively low temperature, fluctuate between a vapor state (a gas) and a liquid state.

Vadose Soil Zone: Is the unsaturated zone of soil starting at the surface and ending at the water table (i.e., the space between the soil particles contains both water and air).

Volatile Organic Compounds (VOCS): Any organic compound that evaporates readily into the air at room temperature.

Water Table: The level below which the soil or rock is saturated with water, sometimes referred to as the upper surface of the saturated zone. The level of groundwater.

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APPENDIX D

RESPONSIVENESS SUMMARY

COPY

FLANDERS FILTERS SITE

WASHINGTON, BEAUFORT COUNTY, NORTH CAROLINA

REGION 4

PROPOSED PLAN PUBLIC MEETING

TUESDAY, JUNE 23, 1998 AT 7:00 P.M.

WASHINGTON CITY COUNCIL CHAMBERS

COURT REPORTER: GAYE H. PAUL

CAROLINA COURT REPORTERS, INC.
102 Oakmont Professional Plaza
Greenville, North Carolina 27858
TEL:(919) 355-4700 (800)849-8448
FAX: (919)355-2100

MS. DIANE BARRETT: TONIGHT WE'RE GOING TO PRESENT THE RESULTS OF A FIELD INVESTIGATION AND THEN GIVE ALL THE TREATMENT OPTIONS TO HANDLE THE CONTAMINANTS AT THE SITE. MY NAME IS DIANE BARRETT, AND I'M THE COMMUNITY INVOLVEMENT COORDINATOR FOR EPA FOR THIS SITE IN NORTH CAROLINA. MR. JON BORNHOLM IS THE PROJECT MANAGER FOR THE SITE FOR EPA. HE TAKES CARE OF ALL THE TECHNICAL ASPECTS, SO HE'S THE ONE THAT WILL ANSWER ALL THE QUESTIONS. MR. DAVID ZEROKI IS ALSO ASSISTING THE EPA; HE IS THE COMMUNITY OUTREACH COORDINATOR. BEFORE WE GET TO THE HEART OF THIS MEETING, I WOULD LIKE TO TAKE A MOMENT TO RECOGNIZE ANY OFFICIALS, STATE OR LOCAL OFFICIALS. BRUCE NICHOLSON IS HERE WITH THE STATE OF NORTH CAROLINA. THANK YOU. AGAIN, I WANT TO THANK ALL OF YOU FOR TAKING YOUR TIME TO ATTEND THIS MEETING. SUPERFUND, SUPERFUND IS THE LAW WHICH CONGRESS ENACTED IN 1980 WHICH GAVE THE ENVIRONMENTAL PROTECTION AGENCY THE AUTHORITY TO CLEAN UP HAZARDOUS WASTE SITES. WITH THIS NEW PROGRAM, WITH THIS NEW LAW, THIS AGENCY HAS BEEN WORKING TOWARD DEVELOPING SUPERFUND INVESTIGATIVE PROCESSES AND METHODS FOR CLEANING UP CONTAMINANTS AT DIFFERENT SITES, SUCH AS THE GROUNDWATER, THE SURFACE WATER, THE STREAMS, THE SEDIMENTS IN THE SOIL AND THE AIR. THE SUPERFUND PROGRAM IS FINANCED THROUGH A TAX THAT IS LEVIED AGAINST CHEMICAL COMPANIES AND PETROLEUM MANUFACTURERS. THESE FUNDS HAVE BEEN PUT IN A SET-ASIDE FUND, AND THEY ARE USED WHENEVER THERE IS

NO VIABLE PARTY TO PAY FOR THE CONTAMINATION OR TO SEE TO THE CLEANUP. IN THE CASE OF THIS PARTICULAR SITE, FLANDERS FILTERS HAS THUS FAR PAID FOR ALL THE WORK THAT IS BEING DONE AND IS EXPECTED TO CONTINUE TO PAY FOR THE REST OF IT. FEATURED ON THIS OVERHEAD CHART HERE IS JUST THE SUPERFUND PROCESS ITSELF AND THE MAJOR STEPS OF THE PROCESS; THROUGHOUT, YOU WILL NOTICE THAT WE HAVE THE VARIOUS ACTIVITIES FOR COMMUNITY OUTREACH. IN ADDITION TO THIS WE ALSO HAVE WHAT THE AGENCY CALLS A TECHNICAL ASSISTANCE GRANT. THIS GRANT IS PROVIDED FOR AN ORGANIZED COMMUNITY GROUP THAT WANTS TO HIRE A CONSULTANT TO HELP THEM GO OVER ALL THE TECHNICAL DOCUMENTS AND PROVIDE COMMENTS AND SO FORTH, AND EXPLAIN MORE IN LAYMAN TERMS WHAT WE'RE SAYING THROUGH ALL THE TECHNICAL DOCUMENTS. ALSO, THERE IS A COMMUNITY ADVISORY GROUP WHICH CAN BE FORMED; HOWEVER, THIS PARTICULAR GROUP DOES NOT HAVE ANY FUNDING. THIS WOULD BE A VOLUNTARY PROGRAM. SO IF ANYBODY IS INTERESTED IN EITHER ONE OF THESE, PLEASE LET ME KNOW AND WE'LL TALK ABOUT THOSE. FLANDERS FILTERS BEGAN OPERATING IN 1969. IN 1978 THE FACILITY BEGAN TO SPRAY TREATED WASTE WATER FROM THE PRODUCTION PROCESS ONTO THE SPRAY FIELD THAT'S LOCATED ON THE SITE. THEN IN 1984 A SECOND SPRAY FIELD WAS OPENED FOR OPERATION. IN ORDER FOR FLANDERS TO OPERATE THESE SPRAY FIELDS, THEY WERE REQUIRED BY THE STATE OF NORTH CAROLINA TO HAVE A PERMIT AND ALSO TO INSTALL MONITORING WELLS SO THAT THEY COULD KEEP TABS ON THE

GROUNDWATER, SO THAT IF ANY CONTAMINATION SHOWED UP WE COULD TAKE THE NECESSARY ACTIONS. THEY ALSO HAD SEVERAL RETENTION PONDS THAT WERE USED FOR HOLDING WATER THAT WAS TREATED. WHEN THE STATE WAS NOTIFIED THAT THERE WAS SOME CONTAMINATION PRESENT, THEY DID A MINI INVESTIGATION AND THEN LATER ON EPA WAS NOTIFIED. THEN AS A MATTER OF OUR STANDARD PROCEDURES WE BEGAN OUR INVESTIGATION. THEN IN 1996, FLANDERS FILTERS AGREED TO WORK WITH EPA TO GET THE SITE CLEANED UP. THAT'S WHAT BRINGS US TO THIS POINT IN TIME. THE REMEDIAL INVESTIGATION HAS BEEN COMPLETED AND JOHN WILL PRESENT THE RESULTS OF THAT REPORT. THEN HE WILL ALSO PRESENT THE RESULTS OF THE VARIOUS OPTIONS THAT CAN BE USED TO TREAT THE CONTAMINATION, AND WE ARE ASKING FOR YOUR INPUT. THE PROPOSED PLAN FACT SHEET WHICH YOU RECEIVED WHEN YOU CAME INTO THE ROOM, WE WANT YOU TO READ THAT AND CONSIDER THE VARIOUS OPTIONS THERE, THE INFORMATION THAT IS THERE AND GIVE US YOUR COMMENTS. A THIRTY DAY TIME FOR COMMENTS HAS BEEN GIVEN FOR THIS PROPOSED PLAN. IT BEGINS TODAY AND ENDS ON JULY 23RD. IT CAN BE EXTENDED ANOTHER THIRTY DAYS IF SOMEBODY ASKS FOR IT; IF YOU NEED THAT, WE'LL BE GLAD TO EXTEND THAT. BUT AT THIS MOMENT, THE COMMENT PERIOD ENDS JULY 23RD. WE HAVE GONE THROUGH THE PROCESS NOW OF THE SITE DISCOVERY, THE REMEDIAL INVESTIGATION, THE FEASIBILITY STUDY AND THE PUBLIC COMMENTS PERIOD, SO THIS IS WHERE WE ARE RIGHT NOW. AFTER THE PUBLIC COMMENT PERIOD HAS ENDED, ALL THE

COMMENTS THAT WE RECEIVE FROM THE PUBLIC BASED ON--AND ALSO ALL THE TECHNICAL INFORMATION THAT WE HAVE DEVELOPED SO FAR WILL BE REVIEWED, AND THEN A REMEDY WILL BE SELECTED. THAT WILL BE THE RECORD OF DECISION, NUMBER 6. THEN ONCE THE RECORD OF DECISION HAS BEEN FINALIZED, A COPY OF THAT WILL BE PUT IN OUR INFORMATION REPOSITORY. HERE WHICH IS THE BROWN PUBLIC LIBRARY ON VAN NORDEN STREET. THE DOCUMENTS IN THE LIBRARY WILL PROVIDE ALL THE TECHNICAL INFORMATION THAT EPA HAS AVAILABLE FOR US, AS WELL AS YOU, TO REVIEW AND MAKE A DECISION. ALSO ON THE TABLE AS YOU CAME IN, AT THE ENTRANCE, THERE IS VARIOUS LITERATURE ON THE CLEANUP OPTIONS THAT WERE CONSIDERING; WE'D LIKE YOU TO REVIEW THAT TOO. AFTER THE PUBLIC COMMENT PERIOD ENDS, AS I SAID, ALL THE DOCUMENTS WILL BE PUT INTO--WELL, THEY SHOULD BE PUT INTO THE REPOSITORY TOMORROW. WE'VE HAD A LITTLE DELAY IN GETTING THE DOCUMENTATION OUT, SO IT SHOULD ARRIVE AND BE IN THE LIBRARY TOMORROW IF YOU WANT TO REVIEW IT. TONIGHT'S MEETING IS ONE OF THE MEETINGS THAT IS REQUIRED BY OUR SUPERFUND LAW. IT IS BEING RECORDED AND A TRANSCRIPT WILL BE MADE AND PLACED IN REPOSITORY FOR YOUR REVIEW. I WOULD LIKE TO ASK, TOO, THAT AFTER JON MAKES HIS PRESENTATION AND WE OPEN IT UP FOR COMMENTS, IF YOU WOULDN'T MIND STANDING AND GIVING YOUR NAME SO THAT THE COURT REPORTER CAN GET YOUR COMMENT ACCURATELY. IF FOR ANY REASON SHE CAN'T UNDERSTAND YOU, SHE'S GOING TO WAVE AT YOU AND SAY STOP; PLEASE REPEAT IT, SO THAT SHE CAN

GET THAT. WE DO THIS TOO, SO THAT WE WILL HAVE A RECORD OF EVERYTHING THAT IS SAID SO THAT WE CAN MAKE SURE THAT WE PROPERLY RESPOND TO ALL THE COMMENTS THAT ARE OFFERED HERE IN THE MEETING AS WELL AS IN WRITING. SO I THANK YOU FOR YOUR ATTENTION. DOES ANYBODY HAVE ANY QUESTIONS THUS FAR? OKAY, JON, I'M GOING TO TURN IT OVER TO YOU. THANK YOU FOR YOUR ATTENTION; WE APPRECIATE IT.

MR. JON BORNHOLM: THANK YOU, DIANE. FIRST OF ALL, I HOPE THAT EVERYBODY HAS PICKED UP A WHITE PACKAGE THAT HAS A COVER SHEET. THIS IS BASICALLY A COPY OF ALL THE OVERHEADS THAT I WILL BE GOING THROUGH TONIGHT, SO THAT IN CASE YOU WANT TO REFER TO THEM LATER ON YOU HAVE A COPY OF THEM. AS DIANE HAS POINTED OUT, MY FIRST COUPLE OF MINUTES WILL BE TO QUICKLY GO THROUGH THE REMEDIAL INVESTIGATION, WHICH ALSO INCLUDES THE BASELINE RISK ASSESSMENT, AND THEN MOVE INTO THE FEASIBILITY STUDY WHERE WE EVALUATED THE ALTERNATIVES, THEN BASICALLY GO THROUGH IN MORE DETAIL WHAT THE AGENCY'S PREFERRED ALTERNATIVE IS. FOR THOSE WHO DON'T KNOW WHERE FLANDERS FILTERS SITE IS, IT'S LOCATED BASICALLY OFF OF 264. DIANE GAVE YOU SOME OF THE HISTORY, SO WE'LL QUICKLY GO THROUGH THIS. BASICALLY THEY STARTED OPERATIONS IN '69. THEY USED THE LOCAL LANDFILL FOR DISPOSAL OF THE WASTE BETWEEN '69 AND '78, AND THEN THEY STARTED USING ON-SITE TREATMENT TO TREAT THEIR WASTE WATER AND USED A SPRAY FILED TO GET RID OF THAT TREATED WATER. AND THAT FIRST SPRAY

FIELD WE CALL SPRAY FIELD NUMBER 1. IN '82, AS DIANE HAS ALLUDED TO, THEY WERE REQUIRED TO PUT IN SOME MONITORING WELLS TO KEEP TRACK OF THE QUALITY OF GROUND WATER AND MAKE SURE THAT WAS NOT BEING IMPACTED. ALSO IN '82 THEY CLOSED SPRAY FIELD NUMBER 1 BECAUSE THEY WERE EXPANDING THE SITE. THEY OPENED UP A SECOND SPRAY FIELD WHICH IS DESIGNATED AS SPRAY FIELD NUMBER 2. AND BECAUSE THEY MOVED THAT SPRAY FIELD, THEY HAD TO PUT ADDITIONAL MONITORING WELLS INTO THE GROUND TO AGAIN MONITOR THE GROUNDWATER QUALITY. BECAUSE SOME CONTAMINANTS DID SHOW UP IN THOSE MONITORING WELLS, AS WELL AS IN THE INACTIVE SUPPLY WELLS ON THE FLANDERS PROPERTY, THE AGENCY STARTED ITS PRELIMINARY REMEDIAL INVESTIGATIONS. FIRST WE DO A SITE SCREENING; AND IF IT PASSES A CERTAIN TEST, IT MOVES ON TO THE NEXT STEP. WE LOOK AT IT IN A LITTLE BIT GREATER DETAIL TO SEE IF THERE IS A CONCERN OUT THERE. THE REASON WHY WE'RE HERE IS IT KEPT ON PASSING THIS TEST, THAT THERE IS A CONCERN OUT THERE, WHICH LED US TO NEGOTIATE WITH FLANDERS FILTERS IN '96; AND THEY SIGNED AN ADMINISTRATIVE ORDER TO DO A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THEIR PROPERTY. ONE OF THE FIRST THINGS WE DID WAS TO PUT WHAT WE CALL A REMEDIAL INVESTIGATION FEASIBILITY STUDY WORK PLAN; THAT'S LIKE OUR MAP; IT KIND OF GUIDES US AS TO HOW WE--WE'RE GOING TO STUDY THAT SITE. THE FIRST THING WE DID WAS TO IDENTIFY AREAS OF CONCERN, WHICH I'VE HIGHLIGHTED IN GREEN HERE. THERE WERE

NINE OF THEM. THIS USED TO BE THE HAZARDOUS WASTE STORAGE AREA, AREA OF CONCERN NUMBER 1; AREA OF CONCERN NUMBER 2 ARE THE RETENTION PONDS, THIS AREA RIGHT HERE, THOSE TWO RETENTION PONDS ON SITE. THE THIRD AREA OF CONCERN WAS THE FIRST SPRAY FIELD, WHICH IS THIS GREEN BOX HERE; AREA NUMBER 4 IS THIS BIG AREA HERE WHICH IS SPRAY FIELD NUMBER 2; AREA OF CONCERN NUMBER 5 WAS THE ABOVE GROUND STORAGE TANK AREA WHICH IS LOCATED RIGHT IN THIS AREA. NUMBER 6 IS THE ABANDONED RAILROAD TRACK THAT IS NORTH OF THE PROPERTY. AREA OF CONCERN NUMBER 7 ARE THOSE DRAINAGE DITCHES THAT DRAIN THE PROPERTY, BASICALLY RIGHT THROUGH HERE. AREA OF CONCERN NUMBER 8 WAS MITCHELL BRANCH ITSELF, WHICH FLOWS DOWN THIS WAY; AND THEN AREA OF CONCERN NUMBER 9 IS THE GROUNDWATER THAT FLOWS UNDERNEATH THE PROPERTY. AND THEN THERE IS A LIST IN THE PACKAGE THAT LISTS ALL OF THOSE AREAS CONCERNED. BASICALLY WHAT THE REMEDIAL INVESTIGATION ITSELF ENTAILED WAS COLLECTING OVER 70 ENVIRONMENTAL SAMPLES, AND THAT'S COLLECTING SAMPLES FROM THE GROUNDWATER, FROM THE SURFACE SOILS, FROM THE SUBSURFACE SOILS, AS WELL AS FROM SURFACE WATER AND SEDIMENT SAMPLES FROM THE DRAINAGE DITCHES, SURFACE WATER AND SEDIMENT SAMPLES FROM MITCHELL BRANCH AND THEN SEDIMENT SAMPLES FROM TRANTERS CREEK. BASICALLY THE MAIN FOCUS OR THE OBJECTIVES OF THE REMEDIAL INVESTIGATION IS FIRST TO DETERMINE WHAT TYPE OF CONTAMINANTS ARE OUT THERE AT THE SITE; TWO, AT WHAT CONCENTRATION; AND THEN BASICALLY THE

THIRD OBJECTIVE IS TO DETERMINE HOW FAR AND WHERE THOSE CONTAMINANTS HAVE MIGRATED. AS TO THE FIRST OBJECTIVE, BASICALLY THE CONTAMINANTS OF CONCERN THAT WE DETECTED OUT AT THE SITE, ON THE LEFT-HAND SIDE ARE BASICALLY WHAT WE CALL VOLATILE ORGANIC COMPOUNDS. THEY'VE ALL GONE EASILY AND QUICKLY INTO THE AIR. AND THEN ON THE RIGHT-HAND SIDE THOSE ARE METALS OR WHAT WE CALL, I'LL USE THE TERM INORGANICS; METALS AND INORGANICS ARE BASICALLY INTERCHANGEABLE. WHERE IS THE CONTAMINATION? BASICALLY WE FOUND TWO SOURCES OUT THERE. AREA OF CONCERN NUMBER 1, WHICH IS THE HAZARDOUS WASTE STORAGE AREA; AREA NUMBER 4 WHICH IS SPRAY FIELD NUMBER 2; AND THEN AREA OF CONCERN NUMBER 5 WHICH IS THE ABOVE GROUND STORAGE TANK AREA. THE NEXT COUPLE OF OVERHEADS BASICALLY JUST HIGHLIGHT--YOU MIGHT NOT BE ABLE TO SEE THE NUMBERS--HIGHLIGHT THE CONTAMINANTS THAT WE DID DETECT IN EACH OF THESE ENVIRONMENTAL AREAS.

BARNEY KANE: ARE THOSE THE ONLY THREE PLACES THAT WERE CONTAMINATED AT THE SCENE? THE OTHER 5 AND 6 AND 3--

JON BORNHOLM: BASICALLY--

BARNEY KANE: SO THE SITES NOT SHOWN THERE

JON BORNHOLM: I'M SORRY?

BARNEY KANE: THE SITES NOT SHOWN THERE, THAT IS 2 AND 3--

JON BORNHOLM: 2, 3--

BARNEY KANE: AND 6, 7, 8 AND 9 WERE NOT CONTAMINATED?

JON BORNHOLM: NO, SOURCES OF CONTAMINATION; THAT MEANS--

BARNEY KANE: OH, SOURCES OF CONTAMINATION.

JON BORNHOLM: OUTSIDE SOURCES OF CONTAMINATION. BASICALLY I'M JUST GOING TO TRY TO GO THROUGH THE OVERHEADS. THIS IS THE SURFACE SOIL SAMPLING. THIS IS A BLOWUP OF AREA NUMBER 1, AREA OF CONCERN NUMBER 1, WHICH IS OVER HERE (INDICATING). WE DID FIND SOME CONTAMINANTS THERE. HERE IS AREA NUM13ER 5, WHICH IS THE ABOVE GROUND STORAGE TANK (INDICATING), AND THEN AREA NUMBER 4, WHICH IS THE SPRAY FIELD. WE DID FIND SOME CONTAMINANTS IN THE SURFACE SOILS THERE. MOVING ON TO THE SURFACE WATER, AREA OF CONCERN NUMBER 7, THE DRAINAGE DITCHES, AND WE DID FIND CONTAMINANTS AND THE VOLATILE ORGANICS THAT I HAVE LISTED UP ABOVE AS WELL AS SOME OF THE METALS--WHICH IS THESE STRANGE PICTURES WE SEE, SURFACE RUNOFF FROM THE SITE AS WELL AS GROUNDWATER DISCHARGING INTO THOSE STREAMS AS WELL. THE NEXT PICTURE SHOWS THE CONTAMINANTS; AGAIN IN THE SURFACE DRAINAGE FEATURES OF THE SITE WOULD BE THE SEDIMENTS OF THE SITE, AGAIN IN WHICH WE FIND HAS BASICALLY THE SAME TYPES OF CONTAMINANTS. MOVING ON TO THE SURFACE WATER OF MITCHELL BRANCH, AND WE ARE SEEING SOME LOW LEVELS OF CONTAMINANTS IN THIS STREAM RIGHT HERE; AND PARTS PER BILLION ARE THE LEVELS

OF CONCENTRATIONS AND THEN IN SEDIMENT. WE ALSO SAMPLED--OR FLANDERS FILTERS SAMPLED THE WETLANDS AREA, WHICH WE TREATED AS A SOIL SAMPLE; AND AGAIN THERE WAS CONTAMINANTS WHICH MAKES SENSE, BECAUSE AS GROUNDWATER PASSES THROUGH THE WETLANDS TOWARDS MITCHELL BRANCH, WE WOULD FIND CONTAMINANTS THERE. MOVING INTO THE GROUNDWATER, WE DID FIND CONTAMINANTS IN THE SHALLOW AQUIFER, WHICH IS BASICALLY THE TOP 20 FEET, FROM GROUND SURFACE DOWN 20 FEET; THEN WE RUN INTO THE YORKTOWN LAYER, WHICH IS A CONFINING LAYER, WHICH ACTS AS A BOUNDARY FOR THE MOVEMENT OF GROUNDWATER SO IT WON'T MOVE MORE VERTICALLY; IT WON'T MOVE FURTHER INTO THE DEEPER AQUIFER THAT UNDERLIES THAT YORKTOWN FORMATION. WE FOUND SOME CONTAMINANTS HERE; THERE'S ALSO TWO MONITORING WELLS, ONE RIGHT HERE, ONE HERE AND ONE HERE (INDICATING) WHICH IS THE NEXT TWO SLIDES, POINT 2; AND THESE ARE DOWNSTREAM OF AREA OF CONCERN NUMBER 1, WHICH IS WHERE WE FOUND BOTH CONTAMINANTS. SO IN MONITORING WELL NUMBER 13 WE HAD SOME HIGH LEVELS, HIGHER LEVELS THAN WE HAD SEEN ACROSS ANY OF THE OTHER PARTS OF THE SITE. THEN IN MONITORING WELL NUMBER 14, WHICH IS AGAIN PRETTY MUCH DOWN RADIANT OF AREA OF CONCERN NUMBER 1. THEN WE'RE SEEING SOME HIGH LEVELS OF THE VOLATILE ORGANICS. AREA OF CONCERN NUMBER 1 WAS UP IN THIS AREA (INDICATING). NOW, I'LL TRY TO TIE ALL THIS INFORMATION TOGETHER WITH ONE MORE PIECE OF INFORMATION BEFORE WE MOVE ON. THIS PICTURE SHOWS THE DIRECTION THE GROUNDWATER IS

FLOWING IN THE SURFACIAL AQUIFER, AND IT'S BASICALLY EVENTUALLY FLOWING TOWARDS MITCHELL BRANCH. THE NEXT TWO FIGURES KIND OF TRY TO DELINEATE THE EXTENT OF GROUNDWATER CONTAMINATION. AGAIN, WE HAVE HIGH LEVELS OF CONTAMINATION UP HERE; WE CAN SEE THE SEDIMENT AROUND WELL DESIGNATED NW-14. THEN AS WE MOVE FURTHER AWAY FROM THE SOURCE, EACH OF THESE LINES REPRESENTS A LEVEL OF NON-DETECT; AND THIS LEVEL HERE, THIS LINE RIGHT HERE REPRESENTS BASICALLY NON-CONTAMINANTS IN THE GROUNDWATER, IN THE SHALLOW GROUNDWATER.

DAN EDWARDS: THAT LAST LINE REPRESENTS WHAT?

MR. BORNHOLM: NO CONTAMINANTS WERE DETECTED BEYOND THIS POINT.

DAN EDWARDS: NONE DETECTED?

MR. BORNHOLM: NONE DETECTED IN THE SHALLOW GROUNDWATER. AND THAT'S FOR A CONTAMINANT OF 1,1-DICHLOROETHENE AND PRETTY MUCH--VERY SIMILAR TO CONTAMINANT 1,1,1,-TRICHLOROETHANE WHICH HAS THAT ACRONYM, 1,1,1,-TCA. AGAIN, THIS IS BASICALLY THE SAME RESULTS. AS WE MOVE CLOSER TO THE SITE BOUNDARY, THE LEVELS OF CONTAMINANTS IN THE SHALLOW GROUNDWATER GO TO NON-DETECT. BECAUSE WE DID FIND CONTAMINANTS IN THE INACTIVE DRINKING--PUBLIC WATER SUPPLY WELLS, WHICH ARE RIGHT HERE, WE DID LOOK INTO THE INTERMEDIATE AQUIFER WHICH IS BELOW THE CLAY LAYER; AND WE DID FIND SOME LOW LEVELS OF CONTAMINANTS, BUT THEY'RE ALL BELOW EITHER STATE GROUNDWATER STANDARDS OR FEDERAL DRINKING

WATER STANDARDS.

BARNEY KANE: WHICH AQUIFER DID YOU FIND IT TO BE BELOW--YOU SAID BELOW THE CLAY LAYER--IS IT THE YORKTOWN OR BELOW THE YORKTOWN?

JON BORNHOLM: BELOW THE YORKTOWN.

BARNEY KANE: IN THE YORKTOWN THERE WAS CONTAMINANTS IN THE DRINKING WATER?

JON BORNHOLM: WHAT THEY'RE THINKING IS THAT THESE WELLS ARE NOT--THE WELL CASING IS NOT A VERY GOOD WELL CASING AND CONTAMINANTS HAVE SLIPPED DOWN ALONG THE CASING, IS WHAT WE WERE ANTICIPATING HAS HAPPENED.

BARNEY KANE: SO YOU'RE SAYING THE VERY WELL YOU PUT IN THE MONITOR CAUSED THE--

JON BORNHOLM: NO, THESE LEVELS ARE ALREADY IN--

BARNEY KANE: OKAY. THE DRINKING WATER.

JON BORNHOLM: THOSE WERE THE INACTIVE DRINKING WATER. AND THAT WAS THE MAIN REASON, I GUESS, WHY THOSE WELLS WERE SHUT DOWN, BECAUSE CONTAMINANTS WERE DETECTED IN THEM. I'LL JUST--NOT TO BELABOR THE POINT AND TRY TO GO OVER THESE QUICKLY. AGAIN, I'VE HIGHLIGHTED WHAT WE FOUND FOR EACH AREA OF CONCERN; NUMBER 1 AGAIN IS A HAZARDOUS WASTE STORAGE AREA; AGAIN, WE DID DETECT CONTAMINANTS THERE. AREA 2, WHICH WERE THE RETENTION PONDS, WE DID NOT DETECT ANY CONTAMINANTS IN THAT AREA--IN THOSE PONDS, I SHOULD SAY. AREA NUMBER 3, WHICH IS SPRAY FIELD NUMBER 1, WE DID NOT FIND

ANY CONTAMINANTS. AREA OF CONCERN NUMBER 4, WHICH IS SPRAY FIELD NUMBER 2, WE DID FIND SOME TRACE LEVEL OF VOLATILE AND SEMI-VOLATILE COMPOUNDS AS WELL AS ZINC. WE ALSO FOUND VOLATILES IN THE GROUNDWATER UNDERNEATH SPRAY FIELD NUMBER 2. AREA OF CONCERN NUMBER 5, WHICH IS THE ABOVE GROUND STORAGE TANK AREA, WE FOUND VOLATILES AND MOST OF THOSE SEMI-VOLATILES ARE FUEL RELATED, BECAUSE THEY DO HAVE A FUEL TANK THERE--OR DIESEL FUEL. AREA NUMBER 6, WHICH WAS THE RAILROAD TRACK, THAT WAS NEVER SAMPLED BECAUSE THE THOUGHT PROCESS THERE WAS IF THERE WERE CONTAMINANTS ASSOCIATED WITH THE RAILROAD TRACK, WE WOULD FIND THEM IN THE DRAINAGE DITCH; AND WE DIDN'T FIND ANY CONTAMINANTS THAT WE COULD TRACE BACK TO THE RAILROAD TRACK AND BASICALLY, THAT WOULD BE CREOSOTE COMPOUNDS. SO THE RAILROAD TRACK WAS NOT SAMPLED. AREA OF CONCERN NUMBER 7, WHICH IS THE DRAINAGE DITCH AREA, WE DID FIND VOLATILE AND SEMI-VOLATILE INORGANIC COMPOUNDS AS WELL AS METALS. IN AREA OF CONCERN NUMBER 8, WHICH IS MITCHELL BRANCH, AGAIN WE DID FIND SOME VOLATILE COMPOUNDS, AS WELL AS SOME METALS. AREA 9, WHICH IS THE UNDERLYING AQUIFER, WE FOUND VOLATILES, SEMI-VOLATILES AS WELL AS METALS. THAT KIND OF JUST RECAPS EVERYTHING I'VE SAID BEFORE. THIS (INDICATING) PUTS IT IN A TABLE FORM, AND THEN THIS IS THE LIST OF CONTAMINANTS I'VE SHOWN YOU BEFORE AT THE VERY BEGINNING, THE CONTAMINANTS WE FOUND AT THE SITE THAT WERE IDENTIFIED AS CONTAMINANTS OF CONCERN EITHER DUE TO THEIR

CONCENTRATION OR THEIR TOXICITY. THAT'S TWO REASONS WHY THEY'RE DEEMED CONTAMINANTS OF CONCERN. EVERYTHING, I THINK, IS SELF EXPLANATORY; THE FIRST COLUMN REPRESENTS THE HIGHEST LEVEL OF CONTAMINANTS DETECTED, AND THEN THE THIRD COLUMN--OR SECOND COLUMN IS NUMBER OF DETECTIONS. WE TOOK 36 GROUNDWATER SAMPLES OUT AT THE SITE, AND THAT TELLS US HOW MANY TIMES WE FOUND THE CONTAMINANTS. FEDERAL MCL IS THE FEDERAL DRINKING WATER STANDARD; SO IT IF EXCEEDS THIS NUMBER, THEN IT EXCEEDS THE FEDERAL DRINKING WATER STANDARD AND BECOMES A CONTAMINANT OF CONCERN AUTOMATICALLY. THIS LAST COLUMN IS THE STATE GROUNDWATER STANDARDS, WHICH ARE TYPICALLY MORE STRINGENT; AND WE ARE REQUIRED TO SELECT THE MOST STRINGENT CLEANUP STANDARD. SO WHAT I'VE TRIED TO DO IN THIS TABLE IS WHERE IT'S SHADED IN, IT IDENTIFIES--THAT WOULD BE THE NUMBER THAT WOULD BE INCLUDED IN THE RECORD OF DECISION AS THE CONCENTRATION THAT NEEDS TO BE MET IN THE GROUNDWATER. AND WHERE THE NUMBERS ARE LOWEST IS THE NUMBERS THAT ARE OF COURSE SELECTED. SO WHERE FEDERAL DRINKING WATER STANDARDS FOR CHLOROFORM IS 100 PARTS PER BILLION, THE STATE STANDARD IS .19; SO THAT'S WHY THAT NUMBER WILL BE SELECTED, BECAUSE IT'S A SMALLER NUMBER, AND IT'S MORE STRINGENT AND THEREFORE, MORE PROTECTIVE. YOU'VE SEEN THE INFORMATION AND THAT'S BASICALLY THE MEAT OF THE REAL INVESTIGATION. THE USES OF--THAT INFORMATION AGAIN, WE'VE IDENTIFIED WHAT CONTAMINANTS ARE OUT AT THE SITE, WHAT CONCENTRATIONS OF

THOSE CONTAMINANTS AND WHERE THOSE CONTAMINANTS HAVE GONE. WE USE THAT INFORMATION INTO WHAT WE CALL A BASELINE RISK ASSESSMENT. IN ORDER FOR THERE TO BE A RISK OR FOR A CHEMICAL TO POSE A RISK, FIRST YOU HAVE TO HAVE A COMPLETE PATHWAY FROM THE SOURCE TO THE RECEPTOR. IF YOU DON'T HAVE A COMPLETE PATHWAY, THERE CAN'T BE A RISK. SO THAT'S THE FIRST THING THAT WE DO IN BASELINE RISK ASSESSMENT, IS TO IDENTIFY ALL THOSE COMPLETE PATHWAYS. THEN WE USE BASICALLY TWO TERMS, WHETHER OR NOT THE CONTAMINANTS ARE CARCINOGEN OR NONCARCINOGEN. FOR SUPERFUND, WHEN WE DO OUR CALCULATIONS, IF THE RISK IS GREATER THAN 1 OUT OF 10,000, THEN IT BECOMES AN UNACCEPTABLE RISK. WHEN IT'S NONCARCINOGEN, WE USE THE TERM HAZARD INDEX; AND IF IT'S GREATER THAN 1, IT'S IDENTIFIED AS AN UNACCEPTABLE RISK; AND THAT'S BASICALLY WHAT RISK ASSESSMENT DOES. WHEN WE DO THOSE MAGIC--WITH OUR MAGIC CALCULATIONS WE USE BODY WEIGHT, YEARS OF EXPOSURE, AND LEVELS OF EXPOSURE TO DETERMINE THE RISK. WHAT THE FLANDERS FILTERS SITE TRIED TO SUMMARIZE WITH THE RISK ASSESSMENT TELLS US IN THE TOP ROW THE CARCINOGENIC RISK AND THE BOTTOM ROW TALKS ABOUT THE NONCARCINOGENIC RISK. THESE ARE ALL THE SCENARIOS THAT WE LOOKED AT THAT AGAIN DEEM COMPLETE PATHWAYS WHERE THERE IS A SOURCE AND A RECEPTOR WHO COULD BE EXPOSED TO THAT SOURCE. WE LOOKED AT THE ON-SITE WORKER, A SITE REPASTS AS EPA SUPERFUND TAKES A VERY CONSERVATIVE APPROACH IN THIS PROCESS, SO WE ALSO LOOKED AT WHETHER OR NOT WE HAD A

CHILD RESIDENT AND ADULT RESIDENT ACTUALLY LIVING ON THAT PROPERTY TODAY, WHAT WOULD BE THE RISK. BECAUSE WE DON'T KNOW WHAT THE FUTURE IS FOR THAT SITE, WE ALSO LOOKED AT THOSE TWO SCENARIOS, THE ADULT AND THE CHILD RESIDENT FOR THE FUTURE. IF FLANDERS FILTERS GOES OUT OF BUSINESS TOMORROW AND A SUBDIVISION GETS BUILT THERE, WE HAVE TO TAKE THAT INTO CONSIDERATION.

DAN EDWARDS: DAN EDWARDS AGAIN; IN THE MAILING--THERE'S A NEW FORM. THIS SEEMS TO VARY FROM WHAT YOU'VE PRESENTED THERE. IS THIS UPDATED?

JON BORNHOLM: I JUST WANT TO GO THROUGH THOSE CORRECTIONS; I HAD SOME MISTAKES THERE. FOR THE BASIC--THE ONLY RISKS POSED BY THE SITE WOULD BE FOR RESIDENTS, EITHER CURRENT OR FUTURE RESIDENTS. SUPERFUND IS GOVERNED BY RISK; IF THERE IS NO RISK IDENTIFIED, NO CLEANUP IS NECESSARY. BECAUSE WE HAVE POTENTIAL RISK, THAT CAN TRIGGER THE NEED FOR A CLEANUP AND THAT'S THE CASE HERE. FOR AN ON-SITE WORKER THERE IS NO RISK FOR--UNACCEPTABLE RISK; FOR TRESPASSERS, THE SAME THING AND THEN FOR THE RESIDENTS THE ONLY RISK WOULD BE USING THE GROUNDWATER; THAT'S THE ONLY SOURCE OUT THERE THAT WOULD CREATE A NON-ACCEPTABLE RISK--OR UNACCEPTABLE RISK--GET RID OF THOSE DOUBLE NEGATIVES. MY FIRST TIME I PUT THAT TOGETHER I SAID "WITHIN ACCEPTABLE RISK" AND IT'S ACTUALLY OUTSIDE THE ACCEPTABLE RISK. ARE THERE ANY QUESTIONS ON THIS TABLE?

BARNEY KANE: WHEN YOU SAY "OUTSIDE" YOU MEAN UNACCEPTABLE?

JON BORNHOLM: YES, UNACCEPTABLE.

BARNEY KANE: SOMETIMES YOU SAY OUTSIDE AND SOMETIMES YOU SAY UNACCEPTABLE. IS THERE A DIFFERENCE BETWEEN WHEN YOU SAY "OUTSIDE ACCEPTABLE" AND "UNACCEPTABLE"? FOR EXAMPLE, CHILD RESIDENT, YOU HAVE "OUTSIDE ACCEPTABLE" IN ONE PLACE AND "UNACCEPTABLE" IN OTHERS; DO YOU MEAN UNACCEPTABLE?

JON BORNHOLM: I'M SORRY, THAT'S TERMINOLOGY--IN SUPERFUND WE USE 1 TO THE 10TH OF THE 4TH, TO 1 TO THE 10TH OF THE MINUS 6 AS THE ACCEPTABLE RANGE; IF IT FALLS WITHIN THAT RANGE 1 OUT OF 10,000 TO 1 OUT OF A MILLION, IT'S ACCEPTABLE; BUT IF YOU'RE OUTSIDE THAT RANGE, IT'S DEEMED NOT ACCEPTABLE.

BARNEY KANE: SO "OUTSIDE ACCEPTABLE" MEANS UNACCEPTABLE?

JON BORNHOLM: YES.

BARNEY KANE: WHY DON'T YOU SAY UNACCEPTABLE; WHY DO YOU USE OUTSIDE ACCEPTABLE WHEN YOU MEAN UNACCEPTABLE?

JON BORNHOLM: THAT'S JUST MY TERMINOLOGY. NOW THAT YOU MENTION IT, IT IS CONFUSING. I APOLOGIZE. GOOD POINT, WE'LL CORRECT THAT. SO BASICALLY WHAT THIS TABLE TELLS US IS WE NEED TO MOVE--WHEN WE GO INTO THE FEASIBILITY STUDY, WE HAVE TO GO BEYOND A NO ACTION ALTERNATIVE.

BASICALLY ALL THE FEASIBILITY STUDY IS IS A PROCESS OF ELIMINATION. WE START WITH A LARGE COOKBOOK OR LIST OF TECHNOLOGIES OR TYPES OF REMEDIES, AND THROUGH A PROCESS OF EVALUATION WE KEEP ON NARROWING THAT LIST DOWN TO A MANAGEABLE NUMBER THAT WE CAN DO A DETAILED ANALYSIS ON. BASICALLY THE PARAMETERS THAT WE USE TO START NARROWING THAT LIST DOWN IS IMPLEMENTABILITY, EFFECTIVENESS OF THE REMEDY OR THAT TECHNOLOGY AND THE COST. THE FIRST STEP WORKS ON SCREENING TECHNOLOGIES. IF A CERTAIN TECHNOLOGY ONLY WORKS ON METALS IN GROUNDWATER, THEN IT WON'T HELP US IF WE HAVE VOLATILES; AND THAT'S THE IDEA. AS FAR AS THAT GOES, THOSE TECHNOLOGIES THAT AREN'T APPLICABLE TO THE PROBLEM AT THE SITE. THEN ONCE WE HAVE THAT LIST OF TECHNOLOGIES DOWN TO A MANAGEABLE NUMBER, WE START TO COMBINE THEM, IF WE NEED TO, INTO WHAT WE CALL REMEDIES--TREATMENT, A TRAIN OF TREATMENT, A TREATMENT TRAIN. A TREATMENT OF TECHNOLOGIES TO ADDRESS THE CONTAMINANTS AT THE SITE. AND THEN WE NARROW THAT LIST DOWN USING THE SAME PARAMETERS AS BEFORE, IMPLEMENTABILITY, EFFECTIVENESS, AND COST. AT THE FLANDERS FILTERS SITE WE WENT THROUGH THAT PROCESS AND WE ENDED UP WITH BASICALLY FOUR ALTERNATIVES, WHICH I'LL GET TO RIGHT AFTER THIS SLIDE. WE HAD FOUR ALTERNATIVES AND IT'S THOSE FOUR ALTERNATIVES THAT WE DID A DETAILED ANALYSIS ON USING THESE PARAMETERS. THE FIRST TWO, THE REMEDY HAS TO ACCOMPLISH THE THRESHOLD CRITERIA. IT HAS TO BE PROTECTIVE, AND IT HAS TO COMPLY WITH

WHAT WE CALL APPLICABLE AND RELATIVE AND APPROPRIATE REQUIREMENTS, BASICALLY STATE GROUNDWATER STANDARDS, DRINKING WATER STANDARDS, SURFACE WATER CLEANUP NUMBERS. IF WE DEVELOP CLEANUP GOALS UNDER OUR RISK PROCESS, WE HAVE TO MEET THOSE. SECOND GROUP OF PARAMETERS USED ARE CALLED THE EVALUATING CRITERIA; WE KIND OF RANK THEM USING THESE PARAMETERS. AND THEN THE LAST TWO--AND THIS IS ONE OF THE REASONS WHY WE'RE HERE TONIGHT, IS TO GAIN COMMUNITY ACCEPTANCE ON THE IDENTIFIED, OR THE PREFERRED ALTERNATIVE, AS WELL AS THE STATE'S; WE NEED THE STATE'S ACCEPTANCE TOO. THIS LISTS THE FOUR ALTERNATIVES THAT WE DID A DETAILED ANALYSIS ON. AGAIN, WE ARE REQUIRED TO KEEP THE NO ACTION ALTERNATIVES THROUGHOUT THE PROCESS, JUST SO THAT WE HAVE A BASELINE. THE SECOND ALTERNATIVE, THE NEW ALTERNATIVE WAS CALLED MONITORED NATURAL ATTENUATION WITH INSTITUTIONAL CONTROLS; ABANDON THE INACTIVE SUPPLY WELLS AND THEN REMOVE THE STORAGE TANKS, THE ABOVE GROUND STORAGE TANKS IN AREA NUMBER 5. THE THIRD ALTERNATIVE IS TO PUMP THE CONTAMINATED GROUNDWATER OUT OF THAT ONE PARTICULAR AREA, TREAT IT TO THE LEVELS NECESSARY TO BE ABLE TO DISCHARGE IT INTO MITCHELL BRANCH UNDER AN NPDS DISCHARGE PERMIT, WHICH STANDS FOR NATURAL POLLUTION DISCHARGE ELIMINATION SYSTEM. THEN TO DO MONITORING TO MAKE SURE THAT WE'RE PUMPING THE RIGHT AMOUNT OF GROUNDWATER. INSTITUTIONAL CONTROLS, ABANDON INACTIVE SUPPLY WELLS AND REMOVE THE TANKS. THE THEN FOURTH

ALTERNATIVE IS BASICALLY AN INSITU PROCESS WHERE WE WOULD PUT WELLS IN THE AREA OF CONTAMINATION, PUMP AIR INTO THE SHALLOW AQUIFER AND THEN WE'D ALSO HAVE SOME OTHER WELLS THAT WE WOULD TRY TO SUCK THAT AIR OUT. THAT AIR WOULD BE DISCHARGED INTO THE ATMOSPHERE AND THEN MONITORED, HAVE INSTITUTION CONTROLS, ABANDON THOSE INACTIVE SUPPLY WELLS AND AGAIN REMOVE THE STORAGE TANKS. BASICALLY THIS IS THE ESTIMATED COST FOR EACH OF THOSE ALTERNATIVES. WHAT THE AEC IS IDENTIFYING AS ITS PREFERRED ALTERNATIVE--AND AGAIN, IT'S THE PREFERRED ALTERNATIVE; IT HAS NOT BEEN SELECTED BECAUSE WE CANNOT SELECT THE ALTERNATIVE UNTIL AFTER THE PUBLIC COMMENT PERIOD; WE ARE PROPOSING ALTERNATIVE NUMBER 2 AS THE AGENCY'S PREFERRED ALTERNATIVE. IN THE EVENT THAT EITHER NATURAL ATTENUATION STOPS OR THE CONTAMINANTS CONTINUE TO MIGRATE BEYOND WHERE WE HAVE IDENTIFIED THEM NOW, OR FOR WHATEVER REASON, WE ARE INCLUDING A CONTINGENT REMEDY IN THE ROD, IN YOUR RECORD OF DECISION, IN THE EVENT THAT THE PREFERRED ALTERNATIVE DOESN'T WORK BASICALLY. THAT'S GOING TO BE OUR FALL-BACK POSITION. NOW JUST QUICKLY--NOT QUICKLY BUT--NATURAL ATTENUATION IS A VERY NEBULOUS TERM WE SAY, AND I TRIED TO DEFINE IT, DESCRIBE WHAT THE ACTION MEANS. BASICALLY IT'S A NUMBER OF PROCESSES WHICH INCLUDE BY REGULATION BACTERIA FUNGUS FEEDING ON THE CONTAMINANTS IN THE GROUND OR IN THE GROUNDWATER, DISPERGENT DILUTION, ABSORPTION; AS THE CONTAMINANTS MOVE TO THE GROUND, THEY

ADHERE TO THE SOIL PARTICLES AND THEREFORE ARE TAKEN OUT OF-- BASICALLY OUT OF CIRCULATION, OUT OF THE ENVIRONMENT IN A SENSE. VOLATILIZATION, IN THAT MOST OF THE CONTAMINANTS OUT AT THE SITE ARE VOLATILES AND THEY ARE VOLATILIZING. THE CONTAMINANTS AS THEY ARE MOVING DOWN MITCHELL BRANCH ARE VOLATILIZING OUT OF THE SURFACE WATER. THEN ALSO IN THE ENVIRONMENT THERE IS ALSO BIOLOGICAL CHEMICAL CHANGES THAT JUST THE ENVIRONMENT DOES TO THE CONTAMINANTS AND EITHER TRANSFORMS CONTAMINANTS INTO A LESS TOXIC, OR SOMETIMES A MORE TOXIC COMPOUND OR EITHER DESTROYS THE CONTAMINANTS. BASICALLY THAT ATTENUATION IS A WHOLE GAMUT OF ACTIVITIES, BUT THEY'RE ALL NATURAL BASICALLY, NATURALLY INCURRED. THE LAST--I THINK IT'S THE LAST TWO PAGES--UNFORTUNATELY I COULDN'T SQUEEZE IT DOWN INTO ONE PAGE--THIS IS BASICALLY THE RATIONALE AS TO WHY THE AGENCY IS SELECTING THIS ALTERNATIVE. THE KEY TERM IS MONITOR; IT'S GOING TO BE LOOKED AT FROM THE SIGNING OF THE RECORD OF DECISION UNTIL THOSE CLEANUP GOALS ARE ACHIEVED. ONE OF THE FIRST THINGS THAT FLANDERS FILTERS WILL BE REQUIRED TO DO IS BASICALLY TO CONFIRM THAT NATURAL ATTENUATION IS OCCURRING AS THEY ANTICIPATED, AS THEY HAD PREDICTED. THAT WILL BE DONE BASICALLY WITH A LONG TERM MONITORING PLAN. AGAIN, AS I MENTIONED BEFORE, THEY DID A VERY ELEMENTARY MODELING; THEY'RE GOING TO BE REQUIRED AS PART OF THE REMEDIAL DESIGN TO DO A MORE SOPHISTICATED MODEL WHICH THIS DATA WILL BE USED TO FEED INTO SO THEY WILL HAVE A

LARGER DATABASE TO MODEL FROM. BECAUSE CONTAMINANTS WILL REMAIN ON SITE, THEY WILL BE REQUIRED TO DO A FIVE YEAR REVIEW UNTIL THOSE CONTAMINANTS DO MEET--UNTIL THEY DO ACHIEVE CLEANUP GOALS. THEY WILL BE REQUIRED TO CONTINUE TO DO A FIVE YEAR REVIEW WHICH IS REQUIRED BY SUPERFUND. INSTITUTIONAL CONTROLS UNDER--THE STATE NOW HAS SOME REGULATIONS WHERE WE CAN RESTRICT LAND USE, SO WE WILL REQUIRE FLANDERS FILTERS TO--BRUCE MIGHT BE ABLE TO ADD INFORMATION TO THIS AS TO HOW THEY DO IT--BUT THEY WILL BE PREVENTED FROM PUTTING POTABLE WELLS ON THE PROPERTY. BASICALLY, THIS IS THE INITIAL EMPHASIS BEHIND THIS EFFORT. FOR DEED RECORDATION, AGAIN JUST TO INFORM ANY POTENTIAL FUTURE BUYER OF THE PROPERTY, FLANDERS FILTERS WILL BE REQUIRED TO PUT ON THEIR DEED THAT THERE IS CONTAMINATION OUT THERE; AND THAT REQUIREMENT, THAT NOTICE WILL REMAIN THERE UNTIL AGAIN, THE CLEANUP LEVELS ARE ACHIEVED. JUST TO PREVENT ANY FURTHER ADDITIONAL CONTAMINATION FROM MIGRATING FROM THE SHALLOW AQUIFER DOWN TO THE DEEPER AQUIFER IN THIS PARTICULAR AREA WHERE THERE ARE INACTIVE SUPPLY WELLS, THEY ARE GOING TO ABANDON THOSE WELLS, UNDER THE STATE REGULATION. FOR ABANDONMENT OF WELLS. THAT'S BASICALLY PULL OUT THE CASING AND GROUT THE HOLE SO NO GROUNDWATER CAN LEAK DOWN IN THE HOLE. THEN BASICALLY JUST AS HOUSEKEEPING ISSUES, FLANDERS HAS INDICATED THEY WERE PLANNING ON MOVING THOSE ABOVE GROUND STORAGE TANKS, SO I'M JUST INCLUDING THAT INTO

THE RECORD OF DECISION. WITH THAT, THAT'S MY PRESENTATION AND I'M MORE THAN HAPPY TO ANSWER ANY QUESTIONS I CAN. FIRST, I WANT TO REMIND YOU TO STATE YOUR NAME SO WE CAN GET THAT FOR THE RECORD. SIR?

BRYAN HARRIS: YES, MY NAME IS BRYAN HARRIS. I LIVE ON MITCHELL BRANCH, JUST ABOUT 100 YARDS FROM MITCHELL BRANCH. I THINK YOU'VE DONE A GOOD JOB SHOWING US THAT THE FLANDERS FILTERS SITE IS GOING TO BE TAKING CARE OF IT. I WONDER IF YOU'VE DONE ADEQUATE SITE SUPPORT FOR MITCHELL BRANCH, BECAUSE EVERYTHING IS DOWN RADIANT FROM FLANDERS FILTERS INTO MITCHELL BRANCH; AND I'M SIMPLY POINTING OUT THAT BOTH TRANTERS CREEK AND MITCHELL BRANCH ARE TIDAL AREAS; THEY CHANGE IN BOTH DIRECTIONS AT LEAST TWICE A DAY AND OBVIOUSLY VARIATION AND DEPTH OF THOSE TO A DEGREE. ALSO, PERIODICALLY DURING THE YEAR THERE IS THERMAL CLIMATE DIVERSION WITH THE TEMPERATURE CHANGE AND VARIOUS SURFACE-- MATERIAL TO THE TOP OF THE CREEK. THIS COMES WITH CHANGES IN THE DEPTH, WHICH IN FACT WASHES SOME OF THE SEDIMENT TO BOTH SIDES OF THE CREEK UP INTO THE SWAMP AREAS ON BOTH SIDES. I'M CONCERNED BECAUSE MITCHELL BRANCH RUNS THROUGH MY BACKYARD, AND WE USE THE CREEK FOR RECREATIONAL PURPOSES. I THINK THE STUDY IS INTERESTING; I'M NOT CONVINCED THAT--YOU HAVE NOT SHOWN THAT YOU HAVE ADEQUATELY INVESTIGATED THE PROBLEM WITH MITCHELL BRANCH, BECAUSE IT'S CLEAR TO ME THAT REMEDIATION OF FLANDERS FILTERS, IT STILL WOULD REMAIN IN

MITCHELL BRANCH A PROBLEM FOR THOSE OF US WHO LIVE THERE NOW AND WILL BE LIVING THERE IN THE FUTURE; I WONDER IF YOU WOULD ADDRESS THAT FOR US?

JON BORNHOLM: BASICALLY THE RISK ASSESSMENT-- AGAIN, LOOKING AT THE LEVELS OF CONTAMINANTS IN MITCHELL BRANCH AND LOOKING AT THE LEVELS OF CONTAMINANTS THAT WERE THERE DID NOT IDENTIFY IT AS A RISK, AN UNACCEPTABLE SOURCE OR UNACCEPTABLE RISK TO THE PUBLIC. IN THAT SENSE--MAYBE YOUR QUESTION CENTERS TO, DO WE HAVE ENOUGH DATA TO EVALUATE THAT. THAT QUESTION IS ASKED QUITE A BIT AT LOTS OF THESE MEETINGS. THERE IS A LIMITED SOURCE OF MONEY AND TIME TO DO THESE TYPES OF STUDIES; NOT THAT ADDRESSES YOUR QUESTION, BUT WE DO THE BEST JOB THAT WE CAN. AND YOU KNOW IT'S A WINDOW, JUST ONE SNAP OF A PICTURE--A TIME FRAME. IF WE CAN ADDRESS THAT WITH ADDITIONAL SAMPLING OF THE CREEK, WE MAY ABLE TO DO THAT.

BRYAN HARRIS: BRYAN HARRIS ONCE AGAIN. YOU DO HAVE A TEST WELL ON MY PROPERTY, AND I WAS VERY HAPPY TO PERMIT THE EPA THE OPPORTUNITY TO PUT THAT TEST WELL. THIS IS ONE OF THE TWO TEST WELLS EAST OF MITCHELL BRANCH--EITHER FLANDERS FILTERS THOUGHT IT WAS NECESSARY OR THE EPA. SO I STILL MAKE THAT OFFER, BUT I STILL AM CONCERNED ABOUT WHAT WILL HAPPEN TO THOSE TWO, TEST OF THOSE. ARE YOU CONFIDENT THE TWO TEST WELLS IS ENOUGH. AND I NOTICE WITH THE TIDAL FLOW, YOU HAVE NO TEST WELLS ABOVE THE FLANDERS FILTERS SITE.

YOU HAVE ONE DIRECTLY ACROSS FROM ME, DOWN STREAM; BUT AS YOU KNOW, THAT TIDAL RANGE HAS A LOT OF MOVEMENT AND IS QUITE SENSITIVE AND AS THE WATER AND ITS CONTENTS SLOSH BACK AND FORTH, TWICE A DAY; SO IF THERE IS MOVEMENT THERE, THAT'S NOT SIMPLY DIRECT DOWN RADIANT OF MOTION; THERE'S A MOVEMENT BACK AND FORTH THAT WASHES THAT MATERIAL.

JON BORNHOLM: ARE YOU TALKING ABOUT THE GROUNDWATER OR THE SURFACE WATER?

BRYAN HARRIS: I'M TALKING ABOUT THE SURFACE WATER.

JON BORNHOLM: UP SURFACE OR UP RADIANT SAMPLES DID NOT PICK UP ANY OF THE VOLATILE ORGANICS THAT--DIDN'T PICK UP ANY VOLATILE ORGANICS. THERE WERE TWO TAKEN ABOVE; ONE RIGHT AFTER THE TRAIN TRESTLE AND THEN ONE FURTHER ABOVE THE TRAIN TRESTLE WHICH DIDN'T SHOW ANY.

BRYAN HARRIS: THESE WERE BOTH ON MITCHELL BRANCH.

JON BORNHOLM: WHERE ON MITCHELL BRANCH?

BRYAN HARRIS: THAT'S GOOD NEWS. HOW ABOUT DOWN STREAM IN TRANTERS CREEK; WHAT'S THE INFLUENCE AT TRANTERS CREEK.

JON BORNHOLM: WE DIDN'T LOOK AT VOLATILES, WE ONLY LOOKED AT METALS, AND WE DID NOT FIND ANY METALS THAT COULD BE TRACED BACK TO FLANDERS FILTERS. THERE'S NATURALLY OCCURRING METALS, BUT YET, THE FIRST THING THAT THE EPA DOES

IS THAT IT HAS TO BE TWICE THE BACKGROUND LEVEL; AND IF IT DOESN'T EXCEED THAT FIRST STEP, WE DON'T EVEN LOOK AT IT. WE DIDN'T FIND ANY METALS TWICE ABOVE BACKGROUND LEVEL.

BRYAN HARRIS: AND THOSE TWO TEST WELLS THEY WILL REMAIN PART OF THE MONITORING PROCEDURE?

JON BORNHOLM: YES.

BRYAN HARRIS: AND THEY WILL BE MAINTAINED AND PAID FOR BY FLANDERS FILTERS?

JON BORNHOLM: YES.

BRYAN HARRIS: AND WILL REPORTS BE GIVEN TO THE COMMUNITY FROM THOSE?

JON BORNHOLM: EVERYTHING THE SUPERFUND DOES IS PUBLIC INFORMATION. SO WHEN THAT DATA BECOMES AVAILABLE, IT WILL BE SHARED.

RYAN HARRIS: THAT WOULD BE IMPORTANT FOR PEOPLE LIVING EAST OF MITCHELL BRANCH IN THE FUTURE. THANK YOU.

DAN EDWARDS: DAN EDWARDS, AGAIN. IN SOME OF YOUR SLIDES YOU MENTIONED THAT THERE WILL BE A CLEANUP GOAL IN NINE YEARS. COULD YOU DEFINE WHAT THOSE CLEANUP GOALS ARE. OBVIOUSLY IT DOESN'T MEAN THE TOTAL ABSENCE OF ANY CONTAMINANTS. WHAT WOULD YOU IDENTIFY THAT--

JON BORNHOLM: BASICALLY THE TABLE-- SOILS DO NOT CREATE AN UNACCEPTABLE RISK; SURFACE WATER OR SEDIMENTS DO NOT CREATE AN UNACCEPTABLE RISK; THE ONLY THING

THAT IS CAUSING UNACCEPTABLE RISK, AGAIN, IT IS A SCENARIO THAT IS NOT HAPPENING RIGHT NOW, WHICH IS RESIDENTS LIVING ON-SITE, WHICH IS NOT THE CASE, OR RESIDENTS LIVING ON THE SITE IN THE FUTURE. BECAUSE OF THOSE RISKS, BECAUSE OF THOSE TWO THINGS, THOSE TWO RISKS, WE'VE LISTED THESE CONTAMINANT SOURCES AS THE CONTAMINANTS ARE CONCERNED; AND THESE SHADED BOXES WILL BE THE CLEANUP GOALS FOR THOSE CONTAMINANTS. AND UNTIL THESE LEVELS ARE REACHED, THE SITE WON'T BE DEEMED CLEAN.

DAN EDWARDS: AND THAT'S PREDICTED TO HAPPEN IN NINE YEARS?

JON BORNHOLM: YES, ON MODELING THAT HAS BEEN DONE.

DAN EDWARDS: THESE ARE--FEDERAL MCL'S--SECONDARY MCL IS THE STATE?

JON BORNHOLM: SECONDARY MCL IS FOR AESTHETIC PURPOSES OUT OF PER SE HEALTH.

DAN EDWARDS: AND THE THIRD COLUMN IS STATE?

JON BORNHOLM: THE THIRD COLUMN IS STATE GROUNDWATER STANDARDS.

DAN EDWARDS: ONE OTHER QUESTION. ALL OF YOUR SAMPLING SEEMS TO MAKE A RECORD OF HOW THINGS ARE NOW?

JON BORNHOLM: YES.

DAN EDWARDS: AND THE THIRD ALTERNATIVE IS THAT ATTENUATION IS GOING TO OCCUR. IS THERE--HOW DO WE KNOW

THERE'S NOT GOING TO BE MOVEMENT OF THIS POLLUTANT?

JON BORNHOLM: THERE COULD BE AND THAT'S WHY THIS PART OF THE REMEDIAL DESIGN, ALTHOUGH IT WON'T BE FOR AN ACTIVE REMEDIATION PER SE, THEY WILL BE REQUIRED TO DEVELOP A LONG TERM MONITORING PLAN AND IMPLEMENT THAT. BASICALLY, THE FIRST YEAR OUR REGION, FOR GUIDANCE, REQUIRED BIMONTHLY SAMPLING.

DAN EDWARDS: BIMONTHLY MEANS EVERY TWO MONTHS?

JON BORNHOLM: NO, TWICE A MONTH FOR THE FIRST YEAR; AND BASED ON THAT INFORMATION IT COULD STAY THE SAME OR BE REDUCED. AGAIN, UNTIL CLEANUP LEVELS ARE ACQUIRED, THEY WILL BE REQUIRED TO DO A FIVE YEAR REVIEW, WHICH REQUIRES SAMPLING SO THAT THEY KNOW WHAT'S GOING ON. THEY CAN SHOW THAT THE PUBLIC IS STILL BEING--THE WHOLE PURPOSE BEHIND FIVE YEAR REVIEW IS TO SHOW THE PUBLIC THAT THEY'LL BE PROTECTED BY THE DEED, THE DEED THAT WAS IMPLEMENTED. THAT'S THE WHOLE PURPOSE OF THAT REVIEW.

BARNEY KANE: IN ONE OF YOUR--THE MAPS YOU HAD SOME--I GUESS IT WAS SOIL--YOU HAD A REFERENCE "HA" TO THE LEADING SITES; WHAT DOES THE "HA" STAND FOR; I GUESS THAT'S NOTING SURFACE WATER AND "SD" I DETERMINE TO MEAN SEDIMENT, BUT WHAT DOES "HA" STAND FOR?

JON BORNHOLM: HAND ARK.

BARNEY KANE: ONE THING I THOUGHT ABOUT, CONTAMINATION IN THE SURFACIAL AQUIFER OR IN THE SURFACE

SOIL, WOULD THAT BE ABOUT 6 INCHES OR MAYBE DOWN DEEPER?

JON BORNHOLM: WE TYPICALLY, AT LEAST AT THIS SITE, SURFACE SOILS AT ANY SUPERFUND SITE, SURFACIAL SOILS IS FROM 0 TO 12 INCHES.

BARNEY KANE: IS THAT WHAT THE "HA" IS FOR?

JON BORNHOLM: NO, THAT'S THE LOCATION OF--WELL, TYPICALLY HOW WE DO OUR BORING, WE TAKE OUR SAMPLES, WE TAKE THE FIRST 12 INCHES; WE CONSIDER THAT A SURFACE SOIL SAMPLE, AND WE CONTINUE THE BORING, SAME HOLE AND COLLECT DEEPER SAMPLES. AT FLANDERS FILTERS, WHERE WE WERE RUNNING INTO GROUNDWATER AT THREE FEET. SO BASICALLY, MOST OF THE SAMPLES WERE DEEMED SURFACIAL SAMPLES, SURFACE SOIL SAMPLES, BECAUSE GROUNDWATER IS SO SHALLOW WE WERE RUNNING INTO IT. AND BASICALLY THE AGENCY'S APPROACH IS ONCE YOU HIT THE GROUNDWATER, IT'S NO LONGER SOIL; IT'S GROUNDWATER. SO IF YOU FIND CONTAMINANTS THERE, IT'S CONSIDERED A GROUNDWATER CONTAMINANT AND NOT A SOIL CONTAMINANT. THAT'S JUST HOW WE INTERPRET THOSE.

BARNEY KANE: IF THE ACETONE OR KETONE WAS IN THAT TOP THREE FEET OF SOIL IN THE "HA" SITES THAT WERE ALONG MITCHELL BRANCH, I'M WONDERING IF YOU GUYS HAVE A PROPOSED MECHANISM BY WHICH YOU--IT GOT THERE. THAT SURELY DIDN'T MIGRATE UP FROM THE GROUNDWATER UNDERNEATH IT, WHICH IS CLEANER THAN THAT.

JON BORNHOLM: NO, WE'RE ASSUMING THAT THE

SOURCE IS GROUNDWATER, AS GROUNDWATER IS MOVING IN-MITCHELL BRANCH IS THE GROUNDWATER BODY FOR THAT AREA. SO GROUNDWATER IS FLOWING UNDERNEATH FLANDERS FILTERS AND IS DISCHARGING INTO MITCHELL BRANCH; SO AS IT IS COMING UP TOWARDS THE CREEK SO ARE THE CONTAMINANTS. THIS IS NOT A SCIENCE; I'LL BE THE FIRST ONE TO ADMIT THAT. SO WE MAY HAVE DETECTION HERE; WE MIGHT PARTICIPATE IN DETECTION RIGHT DOWN STREAM OF IT; YOU WON'T SEE IT, BUT FURTHER DOWNSTREAM YOU MAY SEE THE CONTAMINANTS.

BARNEY KANE: MY PROBLEM IS THAT IF YOU CONTINUE THE MONITORING WELLS IN--AT THAT VICINITY WHEN THERE IS NO METHELELTHYL KETONE OR ACETONE IN THE GROUNDWATER THAT YOU SAY IS A SOURCE OF IT'S SORT OF--SO I'M THINKING THAT THE SPRAY IRRIGATION RAN OVERLAND AND SOAKED IN THE SOIL. AND I'M WONDERING IF YOU'RE GOING TO MAKE A MODEL TO SHOW US HOW IT'S GOING TO ALLEVIATE IN NINE YEARS. SOMEHOW IT WILL BE INTERESTING TO SEE WHAT HAPPENS WHEN YOU'RE SHOWING A VERY HIGH CONCENTRATION OF ACETONE IN SOIL ABOVE THE GROUNDWATER, WHICH YOU THINK IT'S COMING FROM, AND THAT TECHNICALLY CAN'T BE--I'M THINKING THAT IF WE HAD A MODEL FOR GROUNDWATER AND ITS MOVEMENT IN MITCHELL CREEK, BUT YOU DIDN'T HAVE A MODEL FOR THE SURFACIAL--

JON BORNHOLM: ANOTHER THING, AND I WON'T SAY THIS IS WHAT HAS OCCURRED--THAT YOU HAD A SLUDGE WITH THE CONTAMINANTS MOVE WITH GROUNDWATER AND AT THAT POINT NOW

WE'VE SAMPLED.

BARNEY KANE: 70 SAMPLES DOESN'T MAKE--I DON'T THINK YOU CAN--BUT JUST THAT IF YOU HAD ACETONE IN THE SOIL ABOVE GROUNDWATER, AND GROUNDWATER WOULD PROBABLY BE THE SOURCE OF THAT ACETONE.

BRUCE NICHOLSON: WHEN THOSE ORDERS WERE TAKEN AND YOU'VE GOT GROUNDWATER DISCHARGING FROM BELOW UP INTO THE CREEK. IT'S NOT GOING DOWN THE WELL. FOR WHATEVER REASON THAT'S JUST THE CONTAMINANTS THAT ARE IN THAT LAYER OF SOIL THAT'S IN THE ZONE THAT WOULD BE CONSIDERED TO BE AT RISK TO THE FLOW DOWN THE CREEK, BUT NOT TO THE GROUNDWATER BECAUSE THE GROUNDWATER IS DISCHARGING INTO THE CREEK AT THAT POINT.

JON BORNHOLM: AS PART OF--THE BASELINE ASSESSMENT WAS DONE AND BASICALLY THE EVIDENCE OF CONCLUSION WAS NO ADVERSE--NO VISIBLE OR MEASURABLE ADVERSE IMPACT WAS SEEN IN THE WETLANDS. SO YOU COULD PROBABLY DO MORE HARM TRYING TO ADDRESS THAT--THOSE WETLANDS, RATHER THAN LETTING MOTHER NATURE TAKE CARE OF ITSELF, IS BASICALLY WHAT THE CONCLUSION IS. ANY OTHER QUESTIONS?

BARNEY KANE: AT ONE TIME LOOKING AT THAT SITE WAS I RECALL SOMETHING--THAT BECAUSE OF THE ACETONE; WHAT DO THEY THINK THAT IS?

JON BORNHOLM: I'M NOT EVEN SURE WHAT AREA YOU'RE REFERRING TO.

BARNEY KANE: THE SPRAY FIELD.

JON BORNHOLM: WHEN I WAS AT THE SITE, I DIDN'T SEE THAT.

BARNEY KANE: THAT WAS YEARS AND YEARS AGO.

DAN EDWARDS: BACK TO THE GOLDEN NINE YEARS, IF THE LEVELS ARE GOING TO DECREASE FROM NOW 'TIL THEN, THAT WOULD APPLY TO SOME KIND OF A CLOCK, SOME KIND OF PREVIOUS MEASUREMENT OR A PRINCIPAL FOR HOW THAT OCCURS. HOW DO YOU KNOW THAT THE LEVELS ARE GOING TO DROP TO THAT LEVEL IN NINE YEARS?

JON BORNHOLM: DAVID, DO YOU KNOW WHEN THOSE FIRST SAMPLES WERE TAKEN?

DAVID DUNCKLEE: THE SAMPLES WE TOOK--WHAT WAY BACK, YES.

JON BORNHOLM: UNFORTUNATELY, I DIDN'T BRING THAT TABLE. ALL OF THOSE ARE IN THAT. ANY OTHER QUESTIONS?

JON BORNHOLM: THANK YOU FOR ATTENDING. I APPRECIATE YOUR TIME.

BRUCE NICHOLSON: JON, CAN I SAY A WORD OR TWO. I'M BRUCE NICHOLSON WITH THE STATE OF NORTH CAROLINA, AND AS JON HAS SHOWN YOU THERE, A COUPLE OF THE MODIFYING CRITERIA FOR DECISION MAKING ON THIS SITE--COMMUNITY--STATE ACCEPTANCE--OBVIOUSLY WE'LL BE LOOKING AT THE DATA WE'VE HAD ALL ALONG FOR STATE ACCEPTANCE, AND WE'LL BE LOOKING ALSO IF THERE ARE ANY COMMENTS COMING FROM YOU ALL PERTAINING TO THE SITE BEFORE STATE ACCEPTANCE AS WELL; OBVIOUSLY WHAT WE WANT

TO UNDERSTAND IS WHAT THE COMMUNITY THINKS ABOUT THE SITE BEFORE WE ACCEPT THE RECOMMENDATION. SO IF THERE'S ANYBODY WHO WOULD LIKE TO MAKE COMMENTS TO DIRECTLY TO ME, THAT WILL BE FINE TOO.

JON BORNHOLM. BRUCE CAME FROM VACATION AT CAPE HATTERAS JUST FOR THIS MEETING. HE TAKES HIS JOB SERIOUS.

DIANE BARRETT: ONE THING BEFORE WE FINISH THIS. I WANT TO ENCOURAGE YOU TO GET MORE INFORMATION; ALL THE TECHNICAL DOCUMENTS WILL BE IN THE REPOSITORY TOMORROW. SO IF YOU HAVE SOME CONCERNS ABOUT THINGS, IF YOU CAN REVIEW THAT INFORMATION, ALL OF THAT WILL BE IN THERE AND I ENCOURAGE YOU TO DO THAT. WE DO WANT TO HEAR FROM YOU, SO GET YOUR COMMENTS IN TO US. IF YOU WANT AN EXTENSION ON THE COMMENT PERIOD OF TIME, IF YOU FEEL THAT IT'S NOT ADEQUATE, LET US KNOW AND WE'LL EXTEND IT ANOTHER THIRTY DAYS.

BARNEY KANE: ARE THE COSTS, THE WHOLE COSTS BEING BORN BY FLANDERS FILTERS?

JON BORNHOLM: THEY HAVE TO DATE AND WE ANTICIPATE THAT THE REST OF THE COSTS WILL BE BORNE BY THEM.

DIANE BARRETT: IS THAT IT? THANKS, WE APPRECIATE YOUR COMING AND APPRECIATE YOUR COMMENTS AND QUESTIONS.

STATE OF NORTH CAROLINA)
) C-E-R-T-I-F-I-C-A-T-I-O-N
COUNTY OF BEAUFORT)

I, GAYE H. PAUL, A COURT REPORTER AND NOTARY PUBLIC IN AND FOR THE AFORESAID COUNTY AND STATE, DO HEREBY CERTIFY THAT THE FOREGOING PAGES ARE AN ACCURATE TRANSCRIPT OF THE PROPOSED PLAN PUBLIC MEETING WHICH WAS TAKEN BY ME BY STENOMASK, AND TRANSCRIBED UNDER MY DIRECT PERSONAL SUPERVISION.

I FURTHER CERTIFY THAT NEITHER I NOR THE SAID TRANSCRIPTIONIST, IS FINANCIALLY INTERESTED IN THE OUTCOME OF THIS ACTION, A RELATIVE, EMPLOYEE, ATTORNEY OR COUNSEL OF ANY. OF THE PARTIES.

WITNESS, MY HAND AND SEAL, THIS DATE: JULY 8, 1998.

MY COMMISSION EXPIRES JUNE 26, 2000.

<IMG SRC 98085P>

Author: C16cats@aol.com at IN
Date: 9/22/98 2:29 PM
Priority: Normal
BCC: jon bornholm at REGION4
TO: Bornholm.Jon at IN
Subject: Re: 2L Standards

Dear Mr. Bornholm,

Do you have access to Buncombe County's Consent Agreement/Order with the state of NC? I would like to review this agreement in detail if you can direct me to a source.

Mr. Bornholm, who specifically must approve the reopening and subsequent investigation of the Buncombe County Landfill? Since I e-mailed Ms. Gurley and you responded, I assume you must make the initial assessment and forward information to Ms. Gurley. Is this a correct assumption?

Cynthia Edmonds